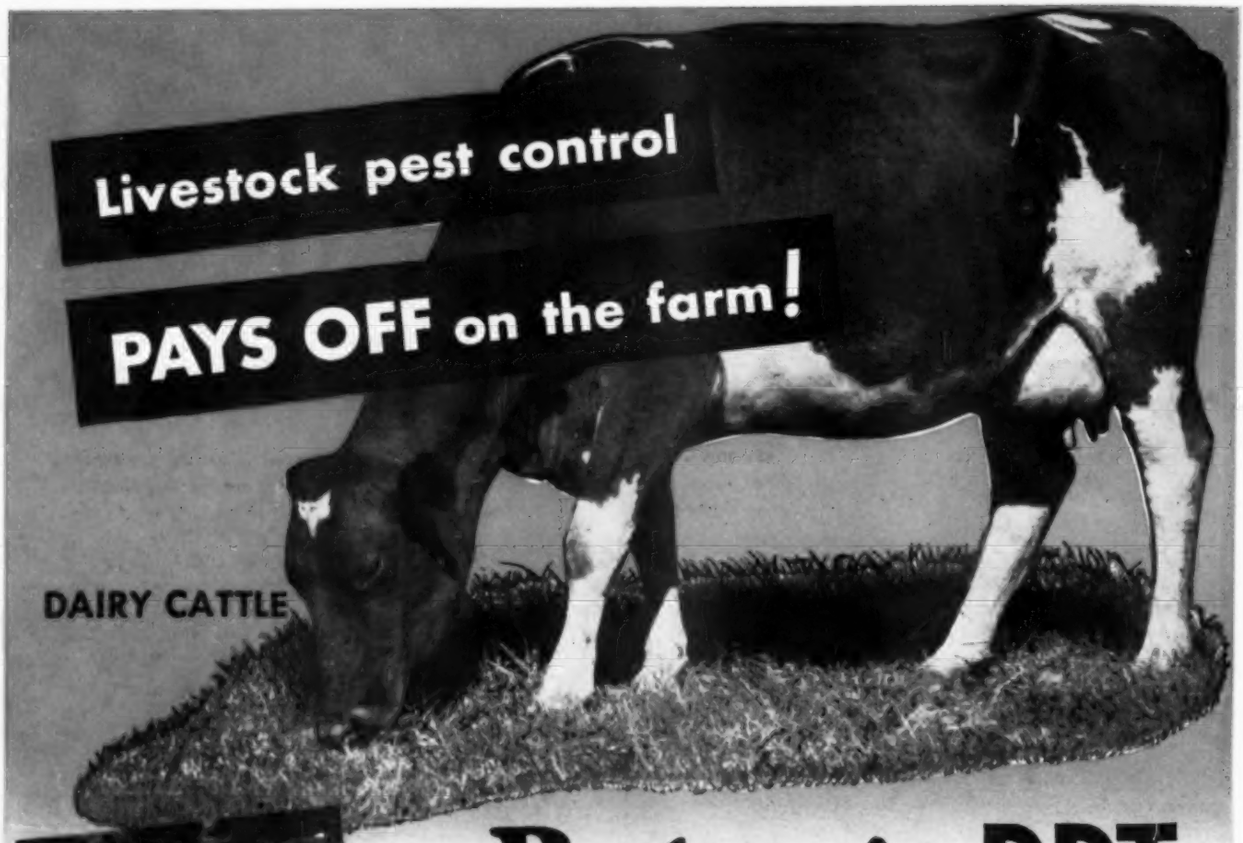
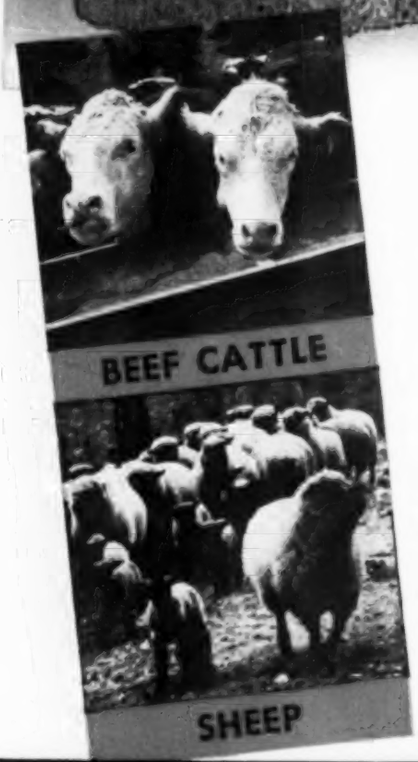
AGRICULTURAL CHEMICALS

AGRICULTURAL INSECTICIDES • FUNGICIDES • STOCK DIPS AND SPRAYS
FUMIGANTS • DAIRY FARM CHEMICALS • WEED CONTROL CHEMICALS • FERTILIZERS
SOIL TREATING MATERIALS • SEED TREATING CHEMICALS • RODENTICIDES

Volume III June, 1948 Number 6





Baker's DDT

helps produce *more meat* and *milk*

Spraying livestock with DDT is fast becoming standard practice on farms and ranches. The reason is easy: It pays off in more milk—extra beef—bigger lambs *... at no extra feed cost!*

Results from tests and personal experiences are convincing farmers rapidly. Spraying dairy cows with DDT increases milk production from 8 to 20% during fly season . . . spraying beef cattle increases gains from ½ to 1 lb. per day during fly-time.

A federal entomologist figures *every pound of DDT* used on beef cattle on one ranch added 1,202 lbs. gain . . . in another case 1,285 lbs. . . . on a third ranch 2,306 lbs.

Treating sheep with DDT, it has been found, almost completely stops death losses due to ticks—gives bigger lambs at market—more and better grades of wool.

The rapidly expanding use of DDT on livestock offers a big opportunity to the insecticide formulator. Get set now for the coming season.

Baker offers you a granular DDT approaching a white color, with a minimum setting point of 89° C. It is uniform in color, makes a clear solution, is free flowing and uniform in particle size. This enables the manufacturer to perfect his mix before grinding.

Baker's DDT comes in 25, 50, 100 and 200 lb. containers. We invite you to write for prices and tell us your requirements. Address *Agricultural Chemical Division*, J. T. Baker Chemical Co., 66 S. Main Street, Phillipsburg, N. J.

Baker's Chemicals

C. P. ANALYZED • FINE • INDUSTRIAL

We're Happy to Announce . . .

Attaclay WILL NOT WEAR WELL

By this we mean that laboratory and other comparisons of Attaclay-extended dusts indicate their lack of abrasiveness—which means insignificant wear on dusting equipment. But, because of this very quality, and all that it means to trouble-free dusting and longer rig-life, Attaclay *will* "wear well" with its users. Here's a diluent where—as with comfortable slippers—appreciation will grow through use.

Take the eight-row rig illustrated. Sixteen hoses and nozzles—innumerable bends—all, are friction points. It's further likely that impeller clearances are close. In such typical rigs, Attaclay's lack of abrasiveness should spell S-A-V-I-N-G-S in time, parts, money.

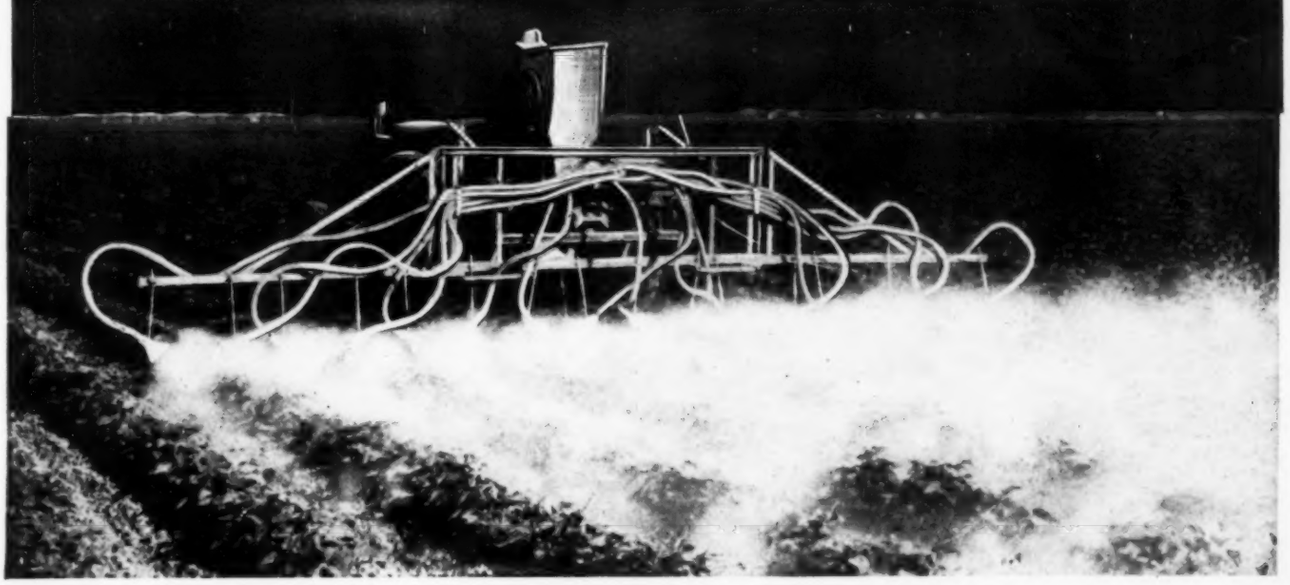
Then, there's *flowability!* Attaclay-extended dusts travel loosely and freely from hopper to nozzle—flow smoothly through the nozzle. And this same lump-free state exists where dusts are liquid-impregnated or oil-conditioned.

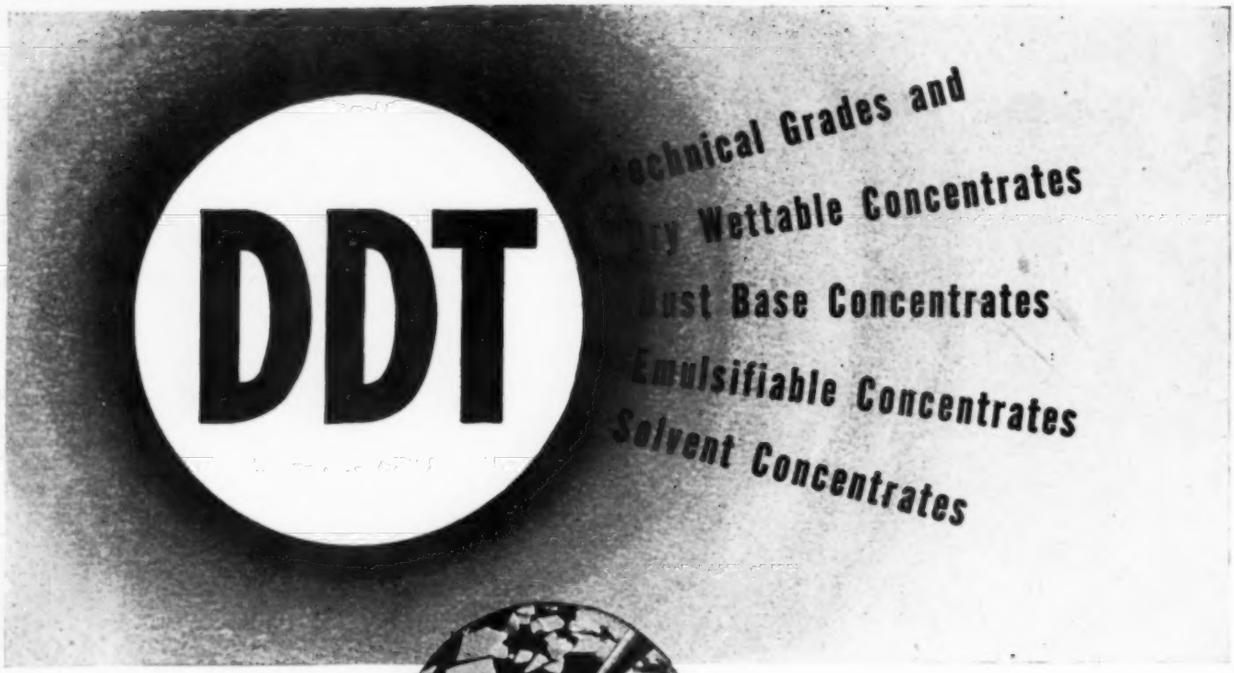
Other "wear well" features? Low bulk density that suggests greater coverage per pound of dust. Particle size that promotes proper dust dispersion. Desirable characteristics as regards adherence to host. Well-established breadth of chemical compatibility.

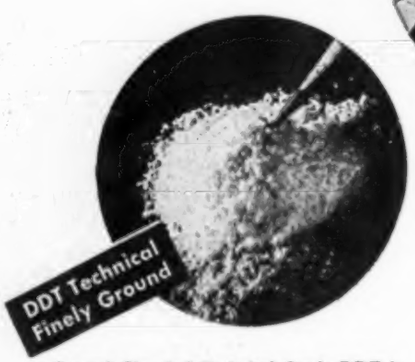
If your dust program calls for the blending or applying of insecticides, fungicides, herbicides, defoliants, fertilizers, soil fumigants, plant hormones, etc., that use or specify Attaclay as the diluent, it'll probably "wear well" [illegible] and your over-all dusting success.

ATTAPULGUS CLAY CO[illegible]

DEPT. [illegible] 210 WEST WASHINGTON SQUARE, PHILADELPHIA 5, PA.







General Chemical Technical Grade DDT is available in either the *finely ground* or the small, *thin flake* types that insure easy handling and processing in your milled or oil-base products. The flake type offers processing efficiencies and economies that are well worth investigating. Samples available.

BASIC CHEMICALS

GC

FOR AMERICAN INDUSTRY

General Chemical's DDT materials are developments of research, production and quality control facilities that are among the nation's foremost. This combination—together with nearly half a century of experience and leadership "in insecticides"—is your assurance that you will always obtain DDT materials of uniformly high quality on every purchase from General Chemical. For your needs . . . write or phone nearest General Chemical Office below.

GENERAL CHEMICAL DDT PRODUCTS:

- DDT TECHNICAL, Finely Ground
- DDT TECHNICAL, Thin Flake
- GENITOX* S-50 (50% DDT Wettable, Microfine)
- GENITOX D-50 (50% Dust Base, Microfine)
- GENITOL* EM-25 (25% Emulsifiable)
- GENITOL EM-30 (30% Emulsifiable)
- GENITOL SC-30 (30% Solvent Concentrate)
- GENITOL SC-40 (40% Solvent Concentrate)

*Reg. U. S. Pat. Off.

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

Makers of the Nation's Foremost ORCHARD BRAND SPRAYS • DUSTS *Insecticides and Fungicides*

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte Chicago • Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles • Minneapolis New York • Philadelphia • Pittsburgh • Portland (Ore.) • Providence • San Francisco • Seattle St. Louis • Wenatchee • Yakima (Wash.)

In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

AGRICULTURAL CHEMICALS

A Monthly Magazine For the Trade

THIS MONTH'S COVER

Fertilizer consumption in the U. S. for the year ending June 30, 1947 was 1,810,973 tons greater than the previous year, says U.S.D.A. report in this issue. Increases were noted the country over. Here is a Harris Broadcaster spreading fertilizer in 140-acre prune orchard at St. Patrick's Home, Colusa, Calif. This outfit, pulled by a Caterpillar diesel tractor, covers about 10 acres per hour. (Caterpillar Tractor Co. photo furnished through courtesy of National Fertilizer Association.)

JUNE 1948
VOL. III No. 6

In This Issue:

AGRICULTURAL CHEMICALS

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Entered as Second Class Matter at the Post Office at Baltimore, Md., under the Act of March 3rd, 1879.

BLOOD makes this tick!

Baird's

TIC-TOX

stops him!

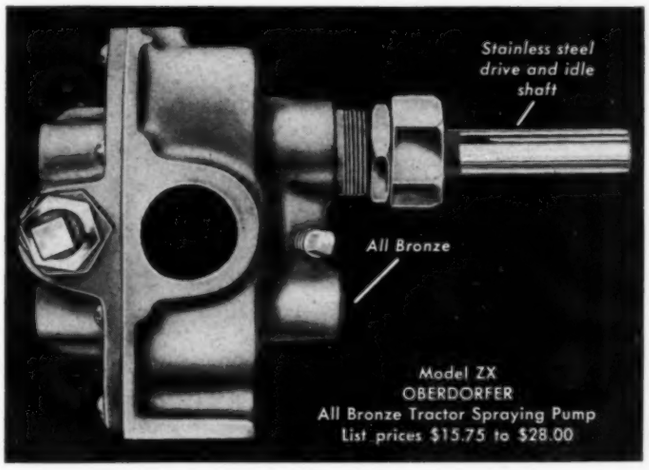
This tick and his brothers and his sisters and his cousins and his aunts (mites and lice) slice large margins from the anticipated profits of ranchers and dairymen. Only a sure, strong cattle dip can eliminate them. Baird & McGuire's TIC-TOX Arsenical Dip, permitted as an official cattle dip by the U. S. Bureau of Animal Husbandry, will in a dilution of 1 to 127, clear infestation.

TIC-TOX Arsenical Dip contains 15.5% metallic arsenic by weight, all in soluble form. Composition of each package is guaranteed to be the same as that of the sample originally submitted to the Department of Agriculture. For a sure-selling cattle dip B & M's TIC-TOX Arsenical Dip ranks first. For use as a dip and as a spray. Further information, samples and prices on request.

Baird & McGuire, Inc.
HOLBROOK, MASSACHUSETTS

Nearly Forty Years of Steady Growth and Growing Service

NEED THERE BE A SPRAYING PUMP SHORTAGE IN THE YEAR AHEAD?



1. No corrosion with bronze and stainless steel.
2. Pressures up to 150 pounds per square inch.
3. Built-in adjustable pressure relief valve.
4. Lower cost than iron of similar design.
5. No priming to 15 feet below pump.
6. Four large Alemite lubricated bearings.
7. Easily installed by any mechanic.
8. ¼", ⅜", ½", ¾" and 1" standard pipe connections.
9. Backed by 50 years of bronze pump manufacturing.
10. All metal — no rubber.
11. From 2 gallons to 600 gallons per acre.

There is an *avoidable* shortage of Oberdorfer Bronze Spraying Pumps this season. We foresaw this shortage, and urged manufacturers of weed spraying equipment last fall, in person, by telephone and letter, and in our advertisements, to get their pump orders to us early. But despite our warnings, many orders did not arrive sufficiently in advance, with the result that here at Oberdorfer we have had to refuse many late-comers altogether, while other deliveries are slower than our customers would have liked.

Commencing in July this year, we expect to manufacture Oberdorfer Bronze Spraying Pumps at the rate of 500,000 a year. This is a great many pumps—but it may not be enough to supply everyone who wants this *North American standard pump* for weed spraying. Already we have allocated a substantial part of this production to orders now on hand for late 1948 and early 1949 delivery.

We strongly urge all farm equipment dealers to estimate their requirements for weed spraying equipment for the next 12 months *now*. Place your orders with the manufacturers of that equipment *now*, so that they in turn can order the pumps and other scarce items needed.

If we all work together in this way there need not be any spraying pump shortage in the next 12 months. Dealers and manufacturers will sell more spraying equipment, and farmers will have this equipment when they need it to increase crop yield.

OBERDORFER BRONZE SPRAYING PUMPS

Send coupon today for list of manufacturers using Oberdorfer Bronze Pumps on weed spraying equipment.

Agricultural Pump Div.
Oberdorfer Foundries, Inc.
5500 Thompson Rd., Syracuse, N. Y.

Please send me without charge or obligation, a list of weed spraying equipment manufacturers using Oberdorfer Bronze Spraying Pumps.

Name.....

Firm.....

Address.....

.....

MERCK IS SERVING THE INSECTICIDE INDUSTRY AS A BASIC AND PRIME SOURCE OF SUPPLY FOR DDT

An aerial view of the Main Plant of Merck & Co., Inc. at Rahway, N. J.

Because of greatly expanded production and sufficient raw materials, we now are in a position to serve an increasing number of manufacturers of DDT insecticides.

The product we offer is—

DDT

TECHNICAL

(dichloro-diphenyl-trichloroethane)

Setting point 89° C. Minimum
For Manufacturing Purposes Only

Write us for prices and let us know your requirements. Please address your inquiry to the Insecticide Products Department, Merck & Co., Inc., Rahway, N. J.

DDT TECHNICAL

For the Manufacture of Agricultural, Livestock, Horticultural, and Household Insecticides

MERCK & CO., Inc. RAHWAY, N. J.

Manufacturing Chemists

New York, N. Y. · Philadelphia, Pa. · St. Louis, Mo. · Chicago, Ill. · Elkton, Va.
Los Angeles, Calif. · In Canada: MERCK & CO., Ltd., Montreal · Toronto · Valleyfield

MERCK MERCK

Yes, he could have saved that crop with Orbiscide Insecticide Concentrates—easily, economically and efficiently. All he'd have to do would be to ask Orbis. There's an Orbiscide product for every insecticide need and an Orbis research laboratory for every insect problem.

If you can use the services of this efficient organization, let us know. If there's a specific problem in insect control we shall be glad to help you solve it at no obligation. We have a technical staff to do the work and complete facilities for any undertaking. Let the men who know insecticides best do it for you.

Investigate these Orbiscide offerings today.

ROTENONE ORBISCIDE CONCENTRATES

Cube Resins—with definite rotenone content.
Cube Powder—4 - 5% Rotenone
5% Rotenone Oil Concentrate

DDT ORBISCIDE CONCENTRATES

25% DDT Emulsifiable Concentrate
30% DDT Oil Concentrate
DDT plus Rotenone Emulsifiable Concentrate
50% DDT Wettable Powder Concentrate
50% DDT Superfine Powder Concentrate

Write, wire or phone for complete information and samples. Let us solve your insecticide problems. No obligation.

INSECTICIDE SALES DIVISION

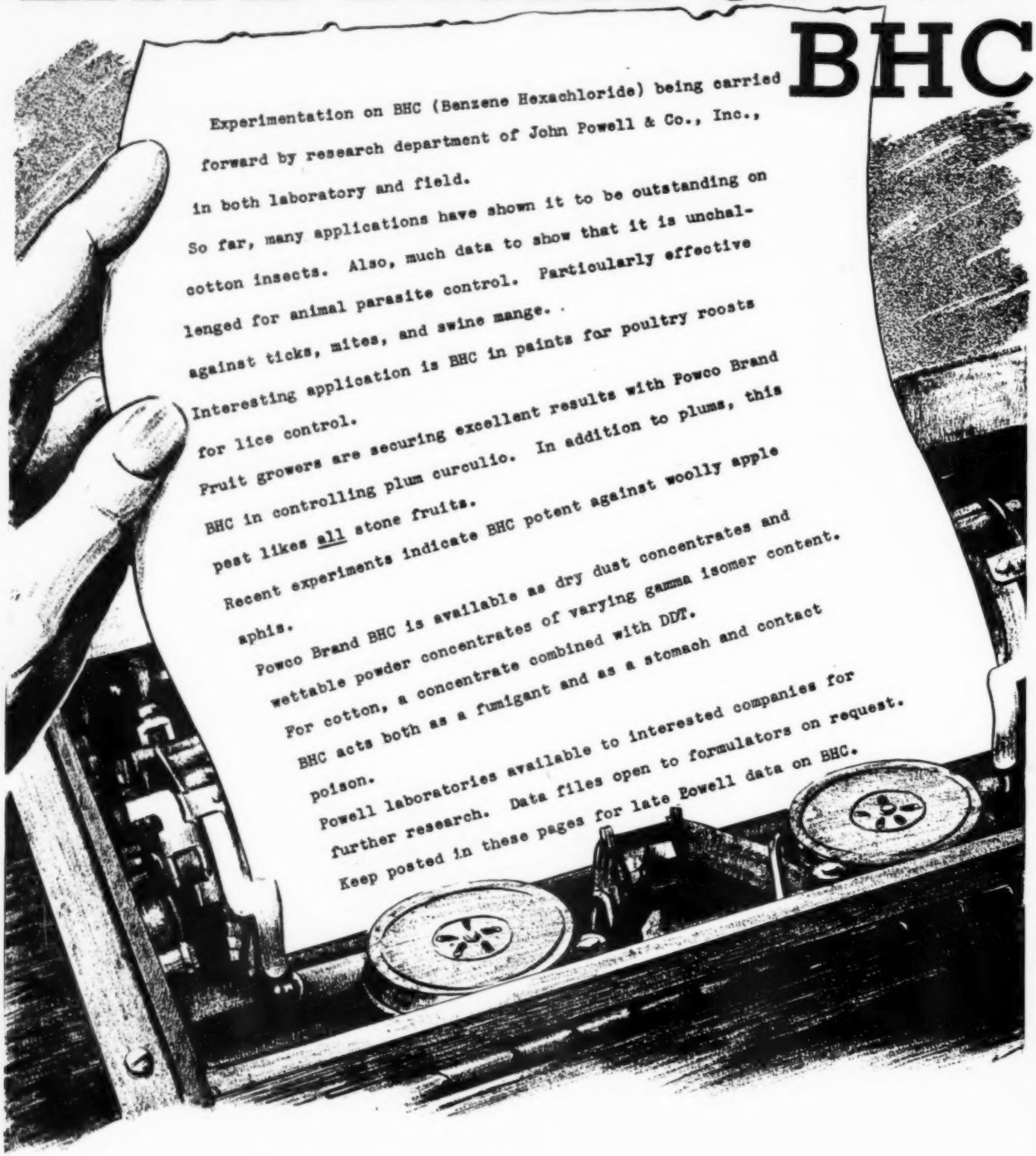
ORBIS PRODUCTS CORPORATION
215 PEARL STREET, NEW YORK
FACTORY AND LABORATORY: NEWARK, N. J.

CUBÉ POWDER · CUBÉ RESIN · ROTENONE CRYSTALS
DERRIS POWDER · DERRIS RESIN · ROTENONE TECHNICAL

ROTENONE CONCENTRATES

CHICAGO · PHILADELPHIA · MEXICO, D.F. · BOSTON · LOS ANGELES · MEMPHIS, TENN.

LATE DATA ON... BHC



Experimentation on BHC (Benzene Hexachloride) being carried forward by research department of John Powell & Co., Inc., in both laboratory and field.

So far, many applications have shown it to be outstanding on cotton insects. Also, much data to show that it is unchallenged for animal parasite control. Particularly effective against ticks, mites, and swine mange.

Interesting application is BHC in paints for poultry roosts for lice control.

Fruit growers are securing excellent results with Powco Brand BHC in controlling plum curculio. In addition to plums, this pest likes all stone fruits.

Recent experiments indicate BHC potent against woolly apple aphis.

Powco Brand BHC is available as dry dust concentrates and wettable powder concentrates of varying gamma isomer content.

For cotton, a concentrate combined with DDT.

BHC acts both as a fumigant and as a stomach and contact poison.

Powell laboratories available to interested companies for further research. Data files open to formulators on request.

Keep posted in these pages for late Powell data on BHC.

John Powell & Co., Inc.

ONE PARK AVENUE NEW YORK 16, N.Y.

SALES OFFICES: CHICAGO - SAN FRANCISCO - PITTSBURGH - PHILADELPHIA - ST. LOUIS
CANADA: CHARLES ALBERT SMITH, LTD., TORONTO - MONTREAL
In Argentina—John Powell Y CIA, Condarco 1535, Buenos Aires, Argentina, Telephone 59, Paternal 0021.
POWCO BRAND PRODUCTS: Antu - Pyrin R - Pyrin D-20 - JP No. 10 - JP No. 25 - JP No. 30 - JP No. 50 - JP No. 50W - Pyrethrum Powders and Extracts - Stimtox "A" - Rotenone Powders - Sabadilla - Aerosol Formulas - 2,4-D - BHC (Benzene Hexachloride) - HETP (Hexaethyl Tetraphosphate).

Now the green light says Go! ...on St. Regis multiwalls!

Our new Kraft Center at Pensacola—where timber is a *crop*—is adding 250,000,000 multiwalls a year. That means you can go ahead and order your St. Regis multiwall paper bags. Practically all you want! Good news for all the industries depending upon St. Regis Packaging Systems for more efficient operation.

A St. Regis packer filling St. Regis multiwall paper bags makes a team that speeds production and cuts container costs. The operation is handled by a single operator.

Customers like the compact, dust-proof packages that multiwalls make, and the fact that the fertilizer flows freely from them. These tough layers of kraft give remarkable protection. They can even withstand a shower in the field!

Talk over your needs with the St. Regis sales office near you. You'll be interested!

SALES SUBSIDIARY OF SR ST. REGIS PAPER COMPANY

ST. REGIS SALES CORPORATION
230 PARK AVENUE • NEW YORK 17, N. Y.

NEW YORK 17: 230 Park Ave. • CHICAGO 1: 230 No. Michigan Ave. • BALTIMORE 2: 1925 O'Sullivan Bldg. SAN FRANCISCO 4: 1 Montgomery St. • ALLENTOWN, PA.: 842 Hamilton St. • OFFICES IN OTHER PRINCIPAL CITIES—IN CANADA: ST. REGIS PAPER CO. (CAN.) LTD., MONTREAL • HAMILTON • VANCOUVER

ST. REGIS PACKAGING SYSTEMS

FOR YOUR INFORMATION

Wisconsin tests prove Nifos-T best for pea aphid control

Recent tests conducted in Wisconsin have demonstrated the outstanding effectiveness of Nifos-T (Monsanto Tetraethyl Pyrophosphate, Technical) in controlling pea aphids.

Nifos-T and seven competitive insecticides were applied to six plots of peas by power duster at the rate of about 35 pounds per acre. Nifos-T yielded by far the best results of all materials used. A 2½% formulation killed 96% of the aphids — even when heavy rainfall occurred immediately after the dusts were applied.

The quick-killing power of Nifos-T extends to a wide variety of aphids, mites, thrips and other destructive insects. Furthermore, Nifos-T does not give rise to problems in residual toxicity. Formulators and processors are invited to send for complete application and technical data. Write to Monsanto, Organic Chemicals Division, or return the coupon, indicating the information you desire.

How do you stand on next year's requirements?

Monsanto now has expanded production of 2,4-D Acid, 2,4-D Sodium Salt and 2,4-D Isopropyl Ester. This is of particular interest, since present indications are that 2,4-D will be used in greater quantities for weed control next year. Formulators are urged to contract early to insure against shortages such as were experienced last season.

Formulators and processors are also invited to send for a new Monsanto bulletin on 2,4-D, containing helpful application and technical data. For your copy, write to Monsanto, Organic Chemicals Division, or simply note your request on the coupon.

Safety Suggestions

Careful use of 2,4-D formulations will result in effective weed control. Of the few simple safety precautions to be observed, the most important are: USE THE RIGHT FORMULATION; DO NOT APPLY IN A HIGH WIND. This will safeguard ornamental and crop plants. Manufacturers and formulators should make every effort to impress users with these vital precautions — by proper labeling and explicit handling instructions.

News of Monsanto Chemicals for Insecticides, Herbicides and Fungicides . . . . . June, 1948

Chinch bug, *Blissus leucopterus* Say.
Approximately 13 times natural size.
Preys on small grains and corn.

SANTOBANE (MONSANTO DDT)

Santobane (Monsanto DDT), when properly formulated and applied, will protect farm profits against the ravages of field-crop insects such as the chinch bug.

Santobane is effective when used in dusts, wettable powders, solutions, emulsifiable solutions and aerosols — for the control of insects in all four major groups: household, premise, agricultural and animal.

A new 28-page book, "Santobane, Monsanto DDT," contains valuable information for manufacturers and formulators of insecticides. Write to Monsanto's Organic Chemicals Division for your copy — or ask for it on the handy coupon.

Santobane: Reg. U. S. Pat. Off.

What is a good germicide?

By definition, a good germicide must be highly effective in killing germs. Santophen 7 not only accomplishes this, but meets many other important practical requirements as well. It is non-staining; can be readily formulated; is effective in the presence of organic matter; is comparatively non-toxic and, in use-dilutions, is non-irritating to man and the higher animals; is general in its germicidal effect (not merely specific toward certain microorganisms).

Reasonable in cost, Santophen 7 possesses other desirable properties, such as faint but pleasing odor, freedom from corrosive action on metals, stability. In addition to meeting the requirements for modern disinfectants, Santophen 7 can also be used to advantage as an industrial preservative and algaecide.

For complete application and technical data, write for a copy of Monsanto Technical Bulletin O-3, "Santophen 7, a Germicide and Industrial Preservative." If you prefer, simply note your request on the coupon.

Santophen: Reg. U. S. Pat. Off.

MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Sales Offices: New York, Philadelphia, Chicago, Boston, Detroit, Cleveland, Akron, Cincinnati, Charlotte, Birmingham, Houston, Los Angeles, San Francisco, Seattle, Portland. In Canada: Monsanto (Canada) Limited, Montreal.

MONSANTO
CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
1700 South Second Street, St. Louis 4, Missouri

ACS-6

Please send me the following:

Name _____ Title _____

Company _____

Type of Business _____

Address _____

City _____ State _____

PENICK PYRETHRUM

EFFECTIVE • PLENTIFUL • LOWER PRICED

PYRETHRUM

GIVES IMMEDIATE CONTROL

- Is non-poisonous, safe and efficient
- Is used in all aerosol formulations
- Is in good supply
- Is priced at pre-war levels

Purified Pyrethrum Extract, 20% pyrethrins—for aerosol

Pure Pyrethrum Extract in odorless base:

Pyrefume Super 20 (contains 2 grams pyrethrins per 100 cc)
Pyrefume Super 30 *(contains 3 grams pyrethrins per 100 cc)
Pyrefume Super 40 *(contains 4 grams pyrethrins per 100 cc)
Pyrefume Super 60 *(contains 6 grams pyrethrins per 100 cc)
Pyrefume Super 100 *(contains 10 grams pyrethrins per 100 cc)

* Important savings in freight are possible with these concentrated extracts.

Pyrefume is also available in pine oil, alcohol or ethylene dichloride base or in emulsifiable form.

Synergized Pyrethrum Extract: Pyrexcel 20 • Emulsifiable Pyrexcel 80

Powdered Pyrethrum • Impregno 2% pyrethrins

OTHER PENICK INSECTICIDE BASES

DDT:
50% Wettable Powder
25% and 30% Oil Solutions
25% and 30% Emulsifiable Concentrates

Penicklor (chlordane):
50% Wettable Powder
46% Emulsifiable Concentrate
20% Oil Solution

Rotenone:
Liquid Extract
5% Emulsifiable
5% Powdered Cube or Derris

For Rodent Control:
Dethdiet Red Squill Powder
Rodine (liquid extract of red squill)

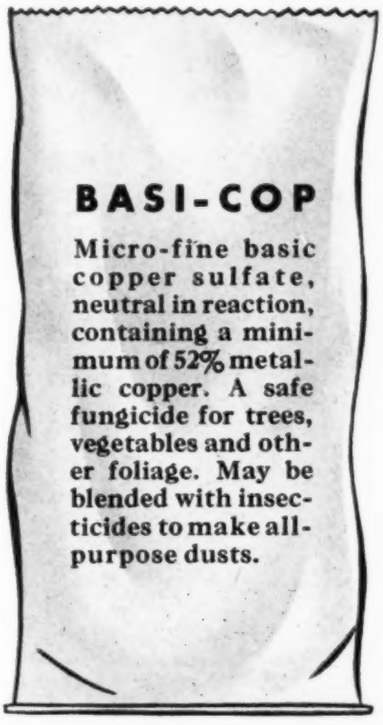
Write us for complete information

S. B. PENICK & COMPANY

50 CHURCH STREET, NEW YORK 7, N. Y.
Telephone, COrtlandt 7-1970

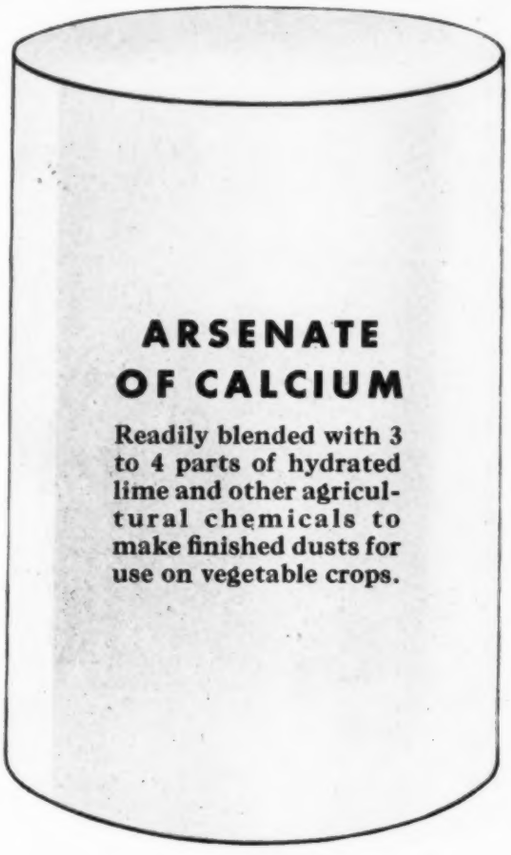
735 WEST DIVISION STREET, CHICAGO 10, ILL.
Telephone, MOHawk 5651

Top-quality concentrates for dust manufacturers



BASI-COP

Micro-fine basic copper sulfate, neutral in reaction, containing a minimum of 52% metallic copper. A safe fungicide for trees, vegetables and other foliage. May be blended with insecticides to make all-purpose dusts.



ARSENATE OF CALCIUM

Readily blended with 3 to 4 parts of hydrated lime and other agricultural chemicals to make finished dusts for use on vegetable crops.

OTHER *SHERWIN-WILLIAMS* CONCENTRATES

DDTOL 50% DUST. Readily blended with diluents to make free-flowing 3% or 5% DDT dusts. (DDTOL VINE-SAFE 50% WETTABLE also available, containing 50% specially refined DDT.)

ARSENATE OF LEAD. For blending to make 10% to 20% dusts.

CHLORPHEEN 40% DUST. Contains 40% by weight of Chlorinated Camphene. Readily blended with diluents (except highly alkaline ones) to make free-flowing dusts for control of grasshoppers and cotton and tobacco insects.

ZINC SULFATE 36%. Spray-dried material for use in products for correcting nutritional deficiencies; "safener" for Arsenate of Lead.

B. C. A. (Basic Copper Arsenate). Total arsenic (expressed as metallic) not less than 24.2%. Copper (expressed as metallic) not less than 41%.

ISO-HEX 5% GAMMA DUST. Contains 5% of the gamma isomer of Benzene Hexachloride. For blending with diluents to make dusts for control of cotton and truck crop insects.

BLACK LEAF 40. For control of aphids and similar sucking insects.

PARIS GREEN. For the manufacture of poison baits for cutworms and of dusts for shade tobacco.

HALODANE 40% WETTABLE. For blending with any diluent (except highly alkaline ones) to make 3% or 5% Chlordan dusts.

In dust concentrates, just as in paints, the Sherwin-Williams name stands for one unvarying quality—*the best!* Start with S-W concentrates for dusts that mean satisfied customers. For detailed information, write to The Sherwin-Williams Co., Agricultural Chemicals Division, Room 1262, Midland Building, Cleveland 1, Ohio.

SHERWIN-WILLIAMS

AGRICULTURAL CHEMICALS

"Lay down de shovel and de hoe!"

2,4-D revolutionizes weed control!

In this day and age, Uncle Ned of the folksong, wouldn't have had to go to his reward in order to "lay down de hoe"! For *chemical weed control* is now an accepted agricultural fact.

Widespread field tests in the past few years have proved that the application of 2,4-D (2,4-Dichlorophenoxyacetic acid) is highly effective for weed control in crops such as corn, wheat, oats, rye and barley, rice, and sugar cane. Not only has it been proved an effective weed control but it has also increased the vigor and yields of agricultural crops.

2,4-D is only one of a wide variety of agricultural chemicals, including insecticides, fungicides, germicides and rodenticides which are produced and marketed.

Your inquiries are invited! Please address them to

PITTSBURGH AGRICULTURAL CHEMICAL CO.
Empire State Building • 350 Fifth Avenue • New York 1, New York
Affiliated with
PITTSBURGH COKE & CHEMICAL COMPANY
Grant Building • Pittsburgh 19, Pa.

Other "Pittsburgh" Agricultural Products

2,4-D Acid—Amines—Esters
Sodium Thiocyanate
BHC (Benzene Hexachloride)
Technical and Formulation Concentrates
DDT (Dichloro Diphenyl Trichloro Ethane)
Technical and Formulation Concentrates
DNOC (Dinitro Ortho Cresol)
ANTU (Alpha Naphthyl Thiourea)
Chlordane Concentrates
HETP TEPP PARATHION
(Organic Phosphate Insecticides)
Paradichlorobenzene
Orthodichlorobenzene
Phenol Disinfectants

PENCO
BHC Products
(BENZENE HEXACHLORIDE)

High Quality Technical 36% Gamma Content

The high gamma content of Penco BHC offers a large saving in freight, handling and storage costs, especially where material is being shipped to distant points. Penco Benzene Hexachloride is the highest gamma content material offered in commercial quantities in the U. S.

When you deal with a Basic Producer like Pennsalt, you are sure of a dependable source of supply—because Pennsalt produces essential raw materials . . . processes them . . . and delivers the finished products to you at fair prices.

You're sure of high quality—because Pennsalt controls manufacture to meet definite specifications for the desired finished product. No question marks, no guesses.

Other Penco Products

In addition to technical grade, Penco Benzene Hexachloride is also available in the following concentrates:

PENCO* W-12
A wettable powder containing 12% gamma isomer. An effective micron-sized product especially compounded for spray application.

PENCO* D-12
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THE EDITOR COMMENTS

FIGURES of the survey by the U. S. Department of Agriculture on fertilizer consumed in the U. S. for the year ending June 30, 1947, are given in this issue of *Agricultural Chemicals*. The results are both startling and significant. Increased shipments have been noted in nearly all sections of the country. The total of commercial mixtures shipped in the U. S. during the period was 11,742,656 tons, and of separate materials, 5,095,530 tons, making a grand total of 16,838,652 tons. This is an increase of 1,810,973 tons over the previous year's total, and is 3,372,623 tons more than 1945.

To state that the fertilizer industry of the U. S. is now "big business" seems rather unnecessary. Its vital role in increasing food production in the face of world-wide shortages has highlighted this importance. Consequently, demand for fertilizer materials is spreading into regions which a decade ago used but little plant food other than natural manures. Of greatest significance, however, is the widespread awakening in the north central states to what fertilizer can do to increase crop yields. In the west north central region, the increase was 61 percent over the previous year, according to the report.

Of particular interest to fertilizer manufacturers is the fact that the number of specified grades of commerical mixtures has increased over those sold in the U. S. in the preceding year. The number reported for the year ending June 30, 1947 is 335, which is 29 more than the number of the previous year, and 65 more than for the year ending in 1945.

Since learning from experience the obvious benefits of commercial fertilizer materials in raising better crops, it is doubtful that progressive farmers will ever return to outmoded fertilizer methods of former years or be satisfied with mediocre crop yields again.

REPORTS from Montana tell of a cooperative educational program being carried on in that state to promote the use of chemical weed killers. Through a series of meetings held in different sections of the state, farmers and ranchers are being told in their own language the merits of chemical control of one of their most persistent agricultural pests. In connection with this program, the sponsoring cooperative is also making arrangements for members to secure equipment to apply the 2,4-D.

From the information we have on hand, this project appears to be sound in principle, and perhaps a harbinger of successful sales efforts for distributors of weed-killing chemicals in that section. Nothing succeeds like success . . . particularly among farmers where word-of-mouth testimony carries much weight. By all means educate the ultimate user on the virtues of chemical weed control! His subsequent use and approval of a product can break down prejudice and doubt in the minds of fellow-farmers more quickly than anything.

TO determine the value of "area" fly control, four cooperating agencies are launching a "double-barreled" program to spray with DDT every head of cattle, every barn, all the sheds, grain bins, every outbuilding and fly-breeding spot in all the villages and towns and on every farm and ranch on Kiowa county, Kansas. While it sounds like a major assignment, the U.S.D.A. Bureau of Entomology and Plant Quarantine, Kansas State Livestock Sanitary Commissioner, Extension Divisions of State colleges of Kansas and Missouri, and the National Livestock Loss Prevention Board seem to be making notable headway in this all-out campaign.

Ray L. Cuff, regional manager of the N.L.L.P.B., Kansas City, one of the country's foremost advocates of eliminating cattle parasites with insecticides, reports that some 35,000

head of cattle in Kiowa county were to be sprayed in one week's time, and that the job of treating all buildings in the area was well under way.

In order that results should be determined in an official and accurate manner, the U.S.D.A. had assigned an entomologist to make fly counts before and after the program. Our guess is that some interesting figures will be forthcoming. And if the data speak favorably for such programs, other communities are likely to decide that they, too, should rid themselves of flies and certain other insect pests through the use of modern toxicants and application equipment.

Quite a number of campaigns were under way last season, but few, if any, on the comprehensive scale which characterizes this current spray blitz in Kansas. *Every* house, *every* stable, *every* head of livestock is quite an order. We await a study of the results with keen interest.

THE "perils of DDT" as well as some of the older insecticides are a worry to scientists, according to Dr. James A. Curran of the American Museum of Natural History. In a recent newspaper interview, he tells of the dangers of arsenic and adds that "DDT is essentially much stronger than the arsenicals." He explains how the use of insecticides may throw nature out of balance, how the aftermath of their use may be fraught with danger. And in painting a rather gloomy picture of insecticide perils, he completely ignores reference to the value and benefits of insect control, especially to agriculture.

That any person familiar with the background of agricultural insect control could overlook the record of insecticides in food production, in field, orchard and home garden seems inexplicable especially with the record of the war years just behind us. That the European corn borer which in 1947 did 97 million dollars in damage in the U. S. shows promise of being conquered by DDT is worthy of note. That potato production has been stepped up twenty to twenty-five per cent by better insect control is also notable. That control of blood-sucking parasites on beef cattle has added something like fifty pounds per head might be mentioned. And a dozen or more similar examples could also be cited.

While the perils of insecticides are receiving attention, we feel, it would not be amiss to mention some of their benefits. Or, maybe Dr. Curran believes that to avoid "throwing nature out of balance," we should permit the insects to destroy our food crops. One might assume this logically if his newpaper comments are taken at their face value.

IN their concentration of efforts to supply the demand for increased fertilizer tonnage, some manufacturers and mixers may be losing sight of the real needs of agriculture because of their current inability to supply both the quantity and grades of fertilizer required. In commenting on 2-12-6 and comparable mixtures, a leading agronomist stated to us recently that the fertilizer manufacturer should begin now to look to the future with a view to the elimination of what he termed off-ratio mixtures.

With a slowing down of the present scramble to supply tonnage and more tonnage, he maintained that large users will become increasingly conscious of quality deficiencies. His belief is that the penalty for failure of early correction of errors born of the post-war rush may be the entrance of more large growers into the fertilizer compounding picture. And with a view to guarding its own future, he feels that the industry should lay plans now for raising general quality standards just as soon as it is physically able to do so.

If, as has been pointed out, a future threat may exist to the producer of mixed fertilizers unless qualities are brought up to meet the needs of all agriculture, we feel that the subject might be given further serious thought. Anything which the industry can do now to solidify its position before the market situation eases,—be it one or five years hence,—and buyers become more choosey, is to the future benefit of its manufacturers and should be done even if it consists only of a discussion of plans. The present is taking care of itself very well; it's the future upon which attention can well be focused.

Guest Editorial written especially for this issue of Agricultural Chemicals.

The Fertilizer Situation in the Western States

by

Dr. Wallace Macfarlane

THE eleven Western States comprise the eight mountain states of Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Idaho and Nevada and the three Pacific Coast States of Washington, Oregon and California.

During the last five years the amount of fertilizer used in these states has just about doubled and in some states has more than doubled. At the present moment there is a very acute shortage of nitrogen in all of these States and shortage of phosphoric acid in part of them. The nitrogen supply comes from by-product steel mills such as the Colorado Fuel and Iron Works at Pueblo, the Geneva Steel Corporation at Geneva, Utah and the Kaiser Steel Corporation at Fontana, California. These plants cannot supply even one-fifth of the nitrogen needed in the Western States. The major part of the nitrogen comes from the Shell Chemical Company's plant at Pittsburg, California and the Consolidated Mining and Smelting Company at Trail, British Columbia and the Hercules Powder Company at Hercules, California. These plants are making nitrogen by a modified Haber process. Even though these plants have tried very hard to serve the farmers and have made additions to their plants within the last two or three years, still there is a shortage. Small amounts of material have been received at various times from eastern and mid-western plants. Within the past year the Stauffer Chemical Company has added new additions to its plants at Steige and Los Angeles and is in a position now to supply all the superphosphate needed in California and Arizona. Simplot of Idaho has enlarged its plant at Pocatello and is now said to be able to supply the superphosphate needs of Oregon, Washington and Idaho as well as Utah and part of the mid-west. The Anaconda Copper Mining Company manufactures treble superphosphate at its plant in Anaconda and has enlarged this plant within the last few months. It is understood that other additions are

(*Turn to Page 77*)

Official U.S.D.A. Report:

Fertilizer Consumption

by

Walter Scholl and Hilda M. Wallace [1]

Division of Fertilizer and Agricultural Lime
Bureau of Plant Industry, Soils and Agricultural Engineering
Agricultural Research Administration
U. S. Department of Agriculture
Beltsville, Maryland

A survey was made of the tonnages of grades of commercial mixtures and kinds of materials used for direct application to the land that were shipped by manufacturers in the year ended June 30, 1947. The tonnage data were used for computing the actual plant food supplied by these fertilizers using analyses from state official reports. Acknowledgment is made to all fertilizer manufacturers, state fertilizer control officials and agronomists, who freely cooperated in providing information for this compilation. The data herewith show the tonnages of fertilizers reported shipped throughout the forty-eight states and territories and include all government distribution. They are considered to be practically complete.

Total Consumption[2]

THE total shipments of commercial mixtures for consumption in the United States is 11,742,656 and of separate materials 5,095,530, making a total of 16,838,652 short tons. This is 1,810,973 tons more than was shipped during the year ended June 30, 1946[3] and 3,372,623 tons more than during 1945[4]. In the 1947, and 1946 and 1945 fiscal years mixed fertilizers were 69.7, 67.9, and 67.3 percent, respectively of the total shipments. The shipments of mixtures and separate materials for the fall and spring seasons by states and regions is presented in Table 1. Thirty-one percent of the total for the year was shipped between July 1 and December 31, 1946 as compared with 27 percent in the same period of 1945. In Figure 1, the shipments of all fertilizers has been shown diagrammatically for the geographic regions of the United States during the past three years. The consumption of fertilizers in 1946-47 as compared with 1945-46 has increased in all regions except New England. The most marked increase in shipments was shown by the East North Central States. In the East North Central States the sales of materials for direct application was responsible for most of this increase. The actual tonnage of mixtures increased most in the South Atlantic Region, but comparatively the largest increase was in the West North Central Region, where it was

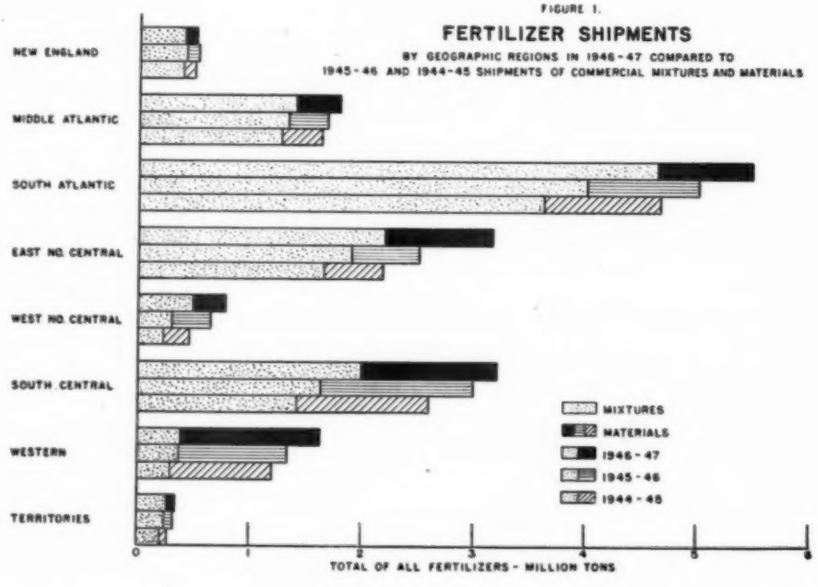
[1] Acknowledgement is made to Arnon L. Mehring for advice and assistance in the preparation of the report.

[2] The words consumption, sales and shipments are used in this report as though they were synonymous. The data represent shipments by manufacturers to dealers and farmers, and no doubt differ slightly from actual consumption in agriculture during this period.

[3] Walter Scholl, Hilda M. Wallace and A. L. Mehring, Commercial Fertilizer, Vol. 75, No. 6A, 69-76 (1947).

[4] A. L. Mehring, Hilda M. Wallace and Walter Scholl, The American Fertilizer, Vol. 105, No. 4, 7-9, 26, 28, 30 (1946).

FIGURE 1.



in the United States

Complete figures for fiscal year ending June 30, 1947...16,838,652 short tons is total of both mixed and separate materials. 1946 total is surpassed

61 percent more than in the previous year.

Mixed Fertilizers

THE number of specified grades of commercial mixtures reported as sold in the continental United States during the year ended June 30, 1947, is 335. This is 29 more than were sold in the year ended June 30, 1946 and 64 more than in the 1945 fiscal year. Approximately 86 percent of the total tonnage in 1946-47 is represented by 27 grades. Table 2 shows the sales and the proportion of the total for the principal grades sold in the continental United States.

The principal grade of mixed fertilizer is the 2-12-6. This has been the leading grade since 1941 and represents 14.9 percent of the total tonnage sold in the continental United States in 1946-47. Better than 74 percent of the tonnage of this grade was sold in the East North Central States and none was reported for the New England or Western Regions. The 3-9-6 grade, ranking second, was practically all sold in the South Atlantic and South Central Regions. The 3-12-6 grade, ranking third in tonnage, was practically all sold in the Middle and South Atlantic Regions. The 5-10-5 and 4-12-4 grades, ranking fourth and fifth in tonnage, respectively, were sold in all regions. These five top grades alone represent approximately 45 percent of the total tonnage of mixed fertilizers sold in the year 1946-47. The weighted average analyses of the top 27 grades sold in 1946-47 representing 50,000 tons or more for each grade, showed these grades supplied 4.0 percent more nitrogen, 3.4 percent more phosphoric acid and 1.8 percent less of potash in 1946-47 as compared to the principal grades consumed in 1945-46[3].

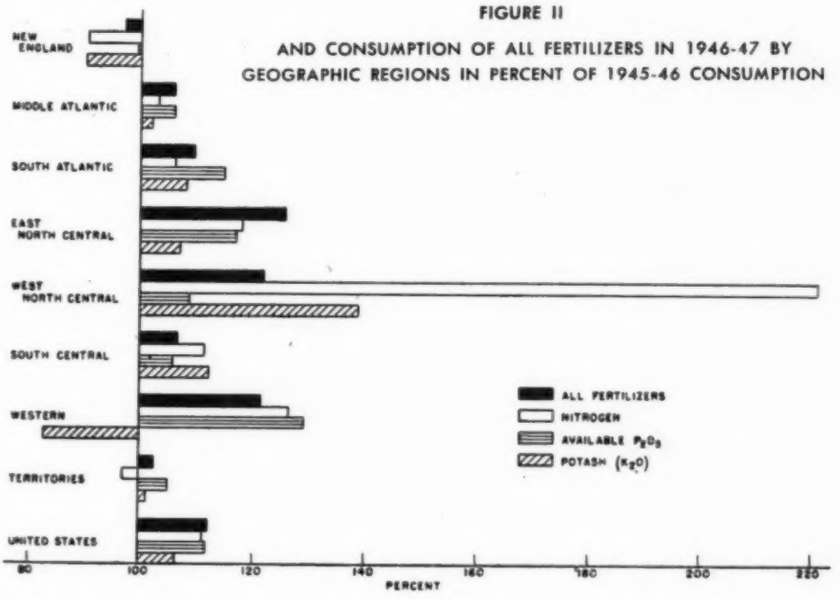
The last four grades, 10-10-5, 7-7-7, 5-7-10 and 6-9-12 replaced grades 4-8-12, 6-8-8, 3-9-18, 6-9-15 and 8-8-4 from the 1945-46 list. Grade 10-10-5 was sold only in the Western Region, grade 7-7-7 principally in the South Atlantic Region, 5-7-10 and 6-9-12 only in the New England Region.

The tonnage sold in each state of the 10 most important regional grades are shown in Table 3.

In the New England region, the 5-10-10 grade is still the best seller as in 1945-46. Although the 5-10-10 is used in every state in this region, the 5-7-10 and 6-9-12 grades sold in larger volume in Maine, 5-8-7 led in Massachusetts, and the 6-3-6 and 5-8-7 grades sold in greater volume in Connecticut. The 4-12-4 grade replaced the 5-10-5 grade listed among the first 10 in 1945-46. Sixty-

FIGURE II

AND CONSUMPTION OF ALL FERTILIZERS IN 1946-47 BY GEOGRAPHIC REGIONS IN PERCENT OF 1945-46 CONSUMPTION



[3] Walter Scholl, Hilda M. Wallace and A. L. Mehring. Loc. cit.

seven specified grades were consumed in this region, the leading 10 of which represented approximately 83 percent of the total sales volume.

The first 8 grades sold in the Middle Atlantic States in 1945-46 were also the principal grades sold in 1946-47. The last 2 grades, 2-12-6 and 4-8-10 replaced 0-12-12 and 6-8-6 from the 1945-46 list. Although 3-12-6 led in sales volume for this region, 5-10-5, 5-10-10 and 4-12-4 sold in greater volume in New York, 5-10-10, 4-12-8 and 5-10-5 sold in larger volume in New Jersey. Of the 102 specified grades sold in this region, the leading 10 grades represented approximately 90 percent of the total volume of sales.

The 10 principal grades sold in the South Atlantic region were practically the same as sold in 1945-46 except that 4-8-8 has been replaced by 4-12-4 grade. The first 5 grades remained in the same order of importance as in 1945-46. Although the 3-9-6 grade led in sales volume for the region it was the principal grade only in North Carolina. Grades leading in other States were as follows: Virginia, 3-12-6; South Carolina, 4-10-6; Georgia, 4-8-6 and Florida, 4-7-5. The 10 principal grades represented 75 percent of the total sales volume out of 128 specified grades sold in this region.

In all states of the East and West North Central region the 2-12-6 remains the principal grade sold. Approximately 55 percent of all specified grades sold in this region was this grade. Approximately 92 percent of all the specified grades was represented in sales volume by the 10 principal grades. Wisconsin showed a marked increase in the number of grades used. These rose from 12 in 1945-46 to 38 in 1946-47.

In the South Central region the 10 principal grades were the same as in 1945-46 except that grade 6-8-6 replaced grade 6-8-8, and the order of arrangement changed somewhat. The pattern of top grades for each state of this region were different. Grade 6-8-4 was the principal grade in this region and in Alabama. No sales of 6-8-4, however, were made in Kentucky or Texas. The top grade in Kentucky and Tennessee was the 3-9-6, in Mississippi, the 5-10-5 and in Arkansas, Louisiana, Oklahoma and Texas, the 4-12-4. Only 59 grades were specified as sold in this region and the principal 10 represented 98 percent of the total sales volume.

In the Western Region the leading grade is the 10-10-5 and has replaced the 8-8-4 which had been the principal grade for several years. The 10-10-5 leads only in California. The principal grade sold in the states of this region are the following: Idaho, 8-12-0; New Mexico, 6-12-0; Washington and Oregon, 4-12-4; Colorado, 5.5-15-5; Nevada, 6-10-4; Arizona, Montana, Wyoming, and Utah, 10-20-0. The number of specified grades sold in this region increased from 131 in 1945-46 to 171 in 1946-47. In Cal-

TABLE 1

Consumption of Commercial Fertilizer Mixtures and Separate Materials During the Year Ended June 30, 1947. 1/

State & Region	Commercial Mixtures			Separate Materials			All Fertilizers
	July 1- Dec. 31 1946	Jan. 1- June 30, 1947	Year 1946-47	July 1- Dec. 31, 1946	Jan. 1- June 30, 1947	Year 1946-47	Year 1946-47
	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Maine	13,218	212,557	225,763	15,681	11,369	26,950	252,703
New Hampshire	1,813	13,510	15,323	5,464	4,382	7,846	23,169
Vermont	3,331	17,930	21,261	21,298	3,473	24,771	46,032
Massachusetts	6,668	57,983	64,651	8,926	10,656	19,582	84,233
Rhode Island	920	12,634	13,554	1,851	1,707	3,838	17,092
Connecticut	3,527	82,096	85,623	7,975	18,987	26,962	82,585
New England	29,475	366,690	396,165	89,075	50,574	109,649	505,814
New York	67,556	318,349	385,905	64,323	124,548	188,871	574,776
New Jersey	46,921	173,859	220,780	7,896	16,035	23,730	244,510
Pennsylvania	147,458	312,215	459,673	31,994	58,879	90,873	550,546
Delaware	18,672	32,956	51,628	946	2,266	3,212	54,840
District of Columbia	613	1,126	1,739	200	414	614	2,353
Maryland	84,384	146,098	230,482	9,716	14,942	24,657	255,139
West Virginia	11,163	42,300	53,463	18,275	23,107	41,382	94,845
Middle Atlantic	376,867	1,026,903	1,403,670	133,148	240,191	373,339	1,776,909
Virginia	142,768	373,041	515,809	73,459	86,891	160,050	675,859
North Carolina	280,910	1,270,582	1,551,492	79,953	152,573	232,526	1,784,018
South Carolina	130,865	573,789	704,654	47,481	112,254	159,705	864,359
Georgia	145,297	911,186	1,056,483	89,725	120,668	210,393	1,266,876
Florida	380,818	429,533	810,351	40,916	31,161	72,077	882,428
South Atlantic	1,080,658	3,558,131	4,638,789	331,504	503,247	834,751	5,473,540
Ohio	286,318	447,312	733,630	22,300	24,429	46,729	780,359
Indiana	192,373	294,653	487,026	32,544	42,512	76,056	663,082
Illinois	77,766	181,994	259,760	314,007	393,705	707,712	967,472
Michigan	104,702	225,722	330,424	31,367	37,568	68,935	399,359
Wisconsin	66,450	220,408	286,858	30,751	31,473	62,224	349,082
East North Central	727,609	1,470,089	2,197,698	431,969	529,687	961,656	3,159,354
Minnesota	23,174	70,942	96,116	22,497	34,131	56,628	152,744
Iowa	46,961	99,436	146,397	31,841	51,434	82,975	229,372
Missouri	73,128	125,587	198,715	38,997	40,333	79,330	278,045
North Dakota	7,017	6,851	13,868	1,035	3,311	4,346	17,914
South Dakota	2,125	1,548	3,673	325	1,425	1,750	5,423
Nebraska	400	1,125	1,525	2,888	7,875	10,763	12,288
Kansas	17,176	12,415	29,591	23,019	21,861	44,880	74,471
West North Central	171,981	317,604	489,585	120,302	160,370	280,672	770,257
Kentucky	58,089	228,256	286,345	46,439	52,767	99,206	385,551
Tennessee	82,605	222,675	278,280	74,378	68,464	142,842	418,122
Alabama	61,687	559,586	621,273	131,934	166,083	298,017	919,290
Mississippi	40,304	231,264	271,568	72,887	198,029	270,916	542,484
Arkansas	12,661	109,069	121,730	36,013	60,270	96,283	218,013
Louisiana	25,138	119,489	144,627	33,812	75,888	109,400	254,027
Oklahoma	5,182	17,319	22,501	15,249	19,676	34,925	57,426
Texas	48,005	161,959	229,964	95,556	80,379	175,935	405,899
South Central	323,671	1,649,617	1,975,288	506,958	721,556	1,227,524	3,200,812
Montana	612	1,489	2,101	2,968	6,779	9,744	11,845
Idaho	2,888	5,529	8,414	15,657	33,809	49,466	57,880
Wyoming	16	306	322	1,866	2,990	4,856	5,178
Colorado	1,661	4,757	6,418	7,210	13,177	20,387	26,805
New Mexico	1,176	1,332	2,508	4,484	6,683	11,167	13,675
Arizona	5,616	5,199	10,815	26,575	23,818	50,393	61,208
Utah	1,386	2,105	3,491	4,222	11,500	15,722	19,213
Nevada	54	222	276	182	265	447	723
Washington	13,690	28,361	42,051	30,178	32,259	62,437	104,488
Oregon	8,952	23,421	32,373	33,185	32,540	65,725	98,098
California	130,239	139,139	269,378	455,665	495,835	951,500	1,220,878
Western	166,287	211,860	378,147	582,189	659,855	1,241,844	1,619,991
Hawaii	16,870	19,519	36,389	20,619	32,243	52,862	89,251
Puerto Rico	102,006	127,020	229,025	6,874	6,359	13,233	242,258
Alaska 2/	--	--	--	--	--	--	466
Territories	118,876	146,539	265,414	27,493	38,602	66,095	331,975
Continental U. S.	2,876,348	8,600,894	11,477,242	2,164,185	2,865,280	5,029,435	16,506,677
Total	2,995,223	8,747,433	11,742,656	2,191,643	2,903,882	5,095,530	16,838,652

1/ Includes ground rock phosphate, basic slag and minor element materials, such as borax, sulphur, manganese sulfate, etc. Also includes fertilizers distributed by Government agencies. Does not include liming materials, but includes gypsum.

2/ Grades and materials not available separately.

ifornia, the numbers of specified grades reported were 82 in 1945-46 and 171 in 1946-47. There are also a large number of speciality grades sold in California in both dry and liquid form that are not specified by grade The 10 principal grades for this region represented approximately 68 percent of the total sales volume.

Materials

THE reported sales of the principal fertilizer materials for direct consumption by farmers, as such and for home mixing, during the year ended June 30, 1947 are presented in Table 4. The total sales of materials amounted to 5,095,530 tons. This was an increase of 269,095 tons compared to 1945-46. Sales increased in the New England, Middle Atlantic, East North Central and Western regions and declined in all of the other regions and the territories. This was quite different from that in respect to mixtures, as all regions except New England increased their sales compared with 1945-46.

Sales of ammonium nitrate and sulfate of ammonia increased 27 and 43 percent, respectively, since 1945-46, whereas usage of calcium cyanamide and nitrate of soda has declined 6 and 40 percent, respectively. The increase in sales of ammonium nitrate was greatest in the West North Central States and that of sulfate of ammonia in the Western States. All other chemical nitrogen materials showed a net increase of 25 percent since 1945-46.

Sales of dried manures nearly doubled in 1946-47 and that of sewage sludge increased 24 percent. Although the general use of organics increased approximately 48 percent, the use of high quality organic materials, such as castor pomace, tankage, and fish scrap declined somewhat.

The sales of rock phosphate increased 72 percent. Illinois alone consumed 631,781 tons out of 774,115 sold in the entire United States for direct use on farms. The sale of normal superphosphates declined 16 percent whereas that of double superphosphates increased 53 percent. Sales of normal superphosphate declined in the North and South Central and South Atlantic regions. Sales volume of double superphosphate increased from 2 to 8 times its 1945-46 volume in the East North Central States and practically doubled in the South Atlantic and South Central regions.

Sales of muriate of potash declined 38 percent. This decrease was general among the Atlantic and Gulf Coast States whereas other regions showed a slight increase. The direct sales of sulfate salts were about 14 percent greater in 1945-46. The increase was greatest in California.

Sales of secondary and minor elements were approximately 11 percent higher than in 1945-46 due to greater use of gypsum in California, North Carolina and Georgia. Large parts of the gypsum and sulfur consumed in the Western States were employed as soil amendments rather than as fertilizers. The proportions are unknown and therefore the entire quantity reported is included in the table.

TABLE 2
Principal Fertilizer Grades Consumed in the Continental U. S., During Year Ended June 30, 1947

Grade	Consumption	Proportion of Total
	Tons	Percent
2-12-6	1,709,909	14.9
3- 9-6	960,521	8.4
3-12-6	836,688	7.3
5-10-5	821,393	7.2
4-12-4	785,815	6.8
4-10-6	759,840	6.6
4- 8-6	598,157	5.2
6- 8-4	404,920	3.5
3-12-12	393,439	3.4
5-10-10	270,166	2.4
4-10-4	242,369	2.1
4-12-8	226,404	2.0
4-10-7	218,877	1.9
0-14-7	217,684	1.9
6- 8-6	210,760	1.8
4- 8-8	204,308	1.8
4- 7-5	142,695	1.2
3- 8-5	136,658	1.2
0-12-12	133,082	1.2
3- 9-9	122,375	1.1
4- 9-3	87,297	0.8
4- 6-8	85,074	0.7
3-18-9	79,031	0.7
10-10-5	65,331	0.6
7- 7-7	63,404	0.6
5- 7-10	62,638	0.5
6- 9-12	50,312	0.4
27 Grades [1]	9,889,147	86.2
308 Other Grades [2]	1,512,236	13.2
Miscellaneous [3]	75,859	0.6
Total	11,477,242	100.0

1 All grades with a volume of 50,000 tons or more
2 All grades with a volume under 50,000 tons
3 All other not specified by grade

Plant Food

THE content of nitrogen, available and total phosphoric acid (P_2O_5) and potash (K_2O) in fertilizers sold during 1946-47 is presented in Table 5, by States and Regions. The total content of plant food amounted to 3,377,957 short tons as compared with 3,061,188 tons for 1945-46 and 2,712,729 tons for 1944-45. Approximately 75 percent of the total plant food was supplied by mixtures. Plant food content of mixed fertilizers averaged 21.44 percent in 1946-47 as compared with 21.65 percent for 1945-46 and 1944-45.

The plant food supplied by fertilizers by geographic regions in percent of that supplied in 1945-46 is shown diagrammatically by Figure 2.

Total shipments for agricultural consumption of nitrogen increased from 701,070 tons in 1945-46 to 783,588 in 1946-47. Fertilizers sold in all regions except New England, Hawaii and a few states, supplied more nitrogen than in 1945-46. The percentage increase in nitrogen was greatest in the West North Central Region followed by the Western States and East North Central States. In the West North Central States nitrogen supplied 25,153 tons, which more than doubled the 11,392 tons supplied in 1945-46. This tonnage, however, represents only 3.2 percent of the total for the United States. Large nitrogen purchasing states in the South Atlantic and South Central regions showed an increase in nitrogen more or less proportional to the increased sales of fertilizers.

Available phosphoric acid supplied by fertilizers increased 12 percent as compared with the previous year. Consumption in 1946-47 was 1,735,895 short tons. Supplies in thirty-eight states, the District of Columbia and Puerto Rico increased,

TABLE 8

Principal Fertilizer Grades Consumed in the Regions and States of the United States, During Year Ended June 30, 1947

Unit - Short Tons

New England

Region & State	Grades[1]	5-10-10	5-7-10	6-9-12	5-8-7	6-3-6	8-12-16	7-7-7	8-9-15	4-12-4	8-16-16	All Other Grades	Total Mixed Fertilizers
Maine	39	31,851	62,638	80,312	7,542	0	21,580	928	14,666	1,574	3,396	31,296	225,783
New Hampshire	28	6,281	0	0	3,235	(2)	(2)	1,440	(2)	835	872	2,662	15,323
Vermont	24	6,092	0	0	2,318	(2)	0	2,164	0	1,469	1,998	7,220	21,261
Massachusetts	34	14,479	0	0	17,170	9,456	0	6,989	0	4,499	1,743	10,315	64,651
Rhode Island	27	7,466	0	0	2,467	0	(2)	960	0	375	(2)	2,286	13,554
Connecticut	41	9,037	0	0	12,836	15,638	(2)	2,879	0	3,068	(2)	12,165	55,623
New England	67	75,206	62,638	80,312	45,566	25,128	21,734	15,360	14,666[3]	11,820	9,482	65,944	396,165

Middle Atlantic

Region & State	Grades[1]	3-12-6	5-10-5	5-10-10	4-12-8	4-12-4	4-8-12	0-14-7	3-9-12	2-12-6	4-8-10	All Other Grades	Total Mixed Fertilizers
New York	56	38,348	171,558	49,813	12,023	38,452	29,432	628	2,850	3,648	0	39,453	385,905
New Jersey	40	19,805	36,226	72,704	55,560	5,404	492	2,111	9,996	254	0	19,229	220,780
Pennsylvania	62	244,772	27,276	35,329	34,135	44,813	9,700	13,488	1,473	9,196	4,790	34,701	459,673
Delaware	44	21,567	5,092	830	6,805	721	2,996	3,486	1,583	233	0	8,318	51,628
Md., D. C.	41	114,336	20,076	1,771	18,648	8,351	6,372	10,358	6,946	4,641	8,064	34,578	232,121
West Virginia	18	20,409	3,673	2,733	5,965	15,666	0	2,508	0	786	0	1,733	53,463
Middle Atlantic	102	459,237	263,901	162,980	131,126	113,407	48,992	32,569	21,847	18,768	12,854	138,009	1,403,570

South Atlantic

Region & State	Grades[1]	3-9-6	4-10-6	4-8-6	3-12-6	5-10-5	4-12-4	4-7-5	6-8-6	3-8-5	3-9-9	All Other Grades	Total Mixed Fertilizers
Virginia	33	60,857	20,917	0	162,980	54,966	62,514	0	25,814	23,852	1,638	99,291	515,809
North Carolina	27	453,390	396,780	4	155,324	85,495	68,699	0	58,274	77,812	33,076	222,658	1,551,492
South Carolina	29	91,751	312,107	3,456	42,718	103,499	26,420	0	1,063	0	56,059	67,591	704,654
Georgia	63	157,994	29,240	456,647	5,263	31,808	22,714	0	50,723	85	29,617	272,469	1,056,483
Florida	73	258	520	137,848	40	1,412	4,296	142,695	1,413	34,708	304	486,857	810,351
South Atlantic	128	764,250	759,544	597,955	366,325	277,180	184,643	142,695	140,277	136,460	120,594	1,148,866	4,638,789

East North Central

Region & State	Grades[1]	2-12-6	3-12-12	0-12-12	0-14-7	3-18-9	4-12-8	3-9-18	0-20-10	8-8-8	3-12-8	All Other Grades	Total Mixed Fertilizers
Ohio	37	530,801	74,353	8,436	18,097	33,291	22,576	1,509	0	6,794	0	37,773	733,630
Indiana	35	343,971	90,049	44,943	19,871	18,341	6,505	11,638	(2)	4,270	(2)	47,538	587,026
Illinois	31	94,541	63,005	20,391	11,135	6,523	14,076	3,923	4,193	9,118	(2)	32,855	259,760
Michigan	36	208,141	45,263	10,119	6,560	4,009	13,420	6,805	(2)	876	(2)	37,531	330,424
Wisconsin	38	92,758	78,500	8,596	22,209	10,031	8,320	3,160	20,885	5,142	(2)	37,257	286,858
E. No. Central	71	1,270,212	349,170	92,485	77,872	72,195	64,897	26,935	26,886	25,900	24,775	166,371	2,197,698

West North Central

Region & State	Grades[1]	2-12-6	4-12-4	3-12-12	4-16-0	0-14-7	4-12-8	3-12-8	4-16-16	3-12-4	4-24-12	All Other Grades	Total Mixed Fertilizers
Minnesota	36	28,681	7,305	11,916	1,230	2,049	4,075	(2)	9,959	(2)	7,820	25,381	98,116
Iowa	30	68,651	7,272	21,569	10,282	5,233	5,222	7,232	0	954	0	19,982	146,397
Missouri	32	91,945	62,572	5,065	3,029	14,284	1,579	2,545	0	6,654	0	11,042	198,715
N.D., S.D. & Neb.	18	8,239	2,483	1,488	1,280	812	1,235	0	355	0	300	2,577	18,769
Kansas	18	11,207	7,864	0	8,324	678	59	0	0	(2)	0	1,459	29,591
W. No. Central	57	206,723	87,496	40,038	24,145	23,056	12,170	9,777[3]	10,314	7,838	7,820	60,441	489,585

South Central

Region & State	Grades[1]	6-8-4	4-12-4	5-10-5	4-10-7	3-9-6	4-10-4	2-12-6	4-8-8	6-8-6	0-14-7	All Other Grades	Total Mixed Fertilizers
Kentucky	21	0	26,770	857	0	92,396	0	71,189	0	52,717	8,857	33,659	286,345
Tennessee	22	21,328	54,199	449	0	99,115	0	45,297	24,045	2,042	9,866	19,241	275,280
Alabama	19	231,476	(2)	480	207,900	(2)	165,962	(2)	0	(2)	0	15,555	621,273
Mississippi	7	98,018	0	119,733	0	0	0	0	38,719	0	455	14,633	271,558
Arkansas	22	3,804	47,868	30,411	0	0	0	(2)	4,447	0	128	35,072	121,730
Louisiana	18	17,408	69,072	38,995	0	0	0	0	1,601	0	8,116	9,438	144,627
Oklahoma	20	145	16,330	4,091	0	0	0	1,039	(2)	0	(2)	896	22,501
Texas	9	0	135,520	68,640	0	0	0	0	5,634	0	2,678	17,492	229,964
South Central	59	372,176	349,759[3]	263,656	207,900	191,509[3]	165,962	117,552	74,446[3]	54,759[3]	29,810[3]	145,886	1,973,288

Western

Region & State	Grades[1]	10-10-5	8-8-4	6-10-4	17-7-0	4-12-4	6-9-6	10-20-0	10-10-2	10-10-0	3-10-10	All Other Grades	Total Mixed Fertilizers
Mont., Wyo., Colo., Utah, Nev.	36	365	9	216	55	822	0	3,796	0	0	0	7,345	12,608
Idaho	18	1,546	0	(2)	0	(2)	0	1,037	0	(2)	(2)	5,831	8,414
New Mexico	12	139	6	0	0	385	0	153	0	209	0	1,636	2,508
Arizona	16	52	0	(2)	0	(2)	0	5,948	0	2,767	0	2,046	10,815
Washington	38	4,767	0	5,602	0	6,933	0	219	0	420	6,737	17,473	42,051
Oregon	39	920	0	3,612	0	5,834	0	118	0	545	5,069	15,375	32,373
California	171	57,542	41,945	23,954	27,718	5,226	15,619	3,159	13,901	9,275	0	71,039	269,378
Western	171	66,331	41,960	33,701	27,773	19,951	15,619	14,430	13,901	13,216[3]	11,806[3]	121,747	376,147

1/ Exclusive of special mixtures or miscellaneous grades, not specified.
2/ Reported by less than three companies - tonnage included under "All Other Grades."
3/ Total of column only. Relatively small additional tonnages are included under "All Other Grades."

while 10 states and Hawaii used less phosphoric acid as compared with 1945-46. The most significant change in the sales of phosphates occurred in Illinois, where there was a large increase in the use of phosphate rock. The usage of available phosphoric acid is more or less proportional to the sales of fertilizers. Commercial mixtures supplied 71 percent of the total. The total phosphoric acid (P_2O_5) content of fertilizers is given in Table 5, for the first time. In a few states, especially those in the North Central Region, there is a significant difference between the available and total P_2O_5, due to the use of large tonnages of phosphate rock. Approximately 85 percent of the total P_2O_5 supplied by all fertilizers for the United states was available P_2O_5.

Total shipments of potash in 1946-47 were 858,474 short tons, compared with 807,315 tons in 1945-46. The increased supply of potash was only 6 percent. The proportional increase in supply of potash was only one-half of the proportional increased sales of fertilizers, or supply of nitrogen and available phosphoric acid. The regional changes in potash supplied by fertilizers varied from a decrease of 17 percent to an increase of 39 percent. In New England fertilizer sales decreased 3 percent whereas that of potash supplied by fertilizers decreased 10 percent. In the Western Region fertilizer sales increased 21

(*Turn to Page 59*)

TABLE 4

Principal Fertilizer Materials Consumed as Such, by States and Regions, During Year Ended June 30, 1947[1]

Unit - Short Tons

State & Region	Ammonium Nitrate	Ammonium Sulfate	Calcium Cyanamide	Nitrate of Soda	Other Chemical Nitrogen Materials [2]	Dried Manures	Other Organics [3]	Rock Phosphate	Superphosphates 18-21%	Superphosphates 20-48%	Other Phosphates [4]	Muriate of Potash 50 & 60%	Other Potash Salts [5]	Minor and Secondary Elements [6]	Total
Maine	207	98	212	604	117	578	65	(7)	24,811	(7)	167	69	8	14	26,950
New Hampshire	51	21	92	534	16	237	76	(7)	6,333	36	139	260	42	9	7,846
Vermont	67	0	44	263	0	113	30	406	23,218	0	527	73	0	30	24,771
Massachusetts	159	63	188	2,559	0	1,799	3,182	120	10,154	(8)	758	540	23	37	19,582
Rhode Island	(7)	(7)	16	166	59	208	345	(7)	2,428	0	204	99	1	12	3,538
Connecticut	49	143	170	2,013	27	517	9,296	(7)	10,148	(7)	1,134	496	2,405	564	26,962
New England [9]	533	325	722	6,139	219	3,452	12,994	670	77,092	135	2,686	1,537	2,479	666	109,649
New York	1,957	186	1,239	10,126	435	2,953	3,492	109	156,647	(7)	1,137	251	67	272	188,871
New Jersey	417	533	1,698	3,591	49	594	2,885	117	11,510	32	1,063	1,183	8	50	23,730
Pennsylvania	166	406	881	1,649	38	2,653	3,063	535	79,251	140	1,408	171	16	496	90,873
Delaware	67	0	141	387	30	45	36	300	2,155	3	24	19	5	0	3,212
Md., D. C.	1,000	22	1,295	2,907	50	1,122	326	0	17,673	0	667	66	76	67	25,271
West Virginia	132	408	141	1,022	3	128	30	33	39,462	0	23	0	0	0	41,382
Middle Atlantic	3,739	1,555	5,395	19,682	605	7,495	9,832	1,094	316,698	175	4,322	1,690	172	885	373,339
Virginia	3,070	265	1,938	14,087	6,533	491	587	57	99,056	15,481	6,351	221	45	11,868	160,050
North Carolina	5,769	1,071	13,232	60,228	21,346	100	13,555	240	55,662	4,384	13,973	3,184	2,818	36,964	232,526
South Carolina	2,966	2,175	2,803	63,866	22,895	131	7,116	40	38,121	295	5,915	4,486	4,312	4,644	159,705
Georgia	7,858	1,784	4,358	51,713	9,071	275	2,643	131	97,713	3,124	17,155	1,962	2,143	10,463	210,393
Florida	1,454	466	3,263	11,842	2,373	3,040	3,764	6,358	16,262	678	7,119	4,621	8,644	2,393	72,077
South Atlantic	21,117	5,761	25,594	201,536	62,218	4,037	27,665	6,826	306,814	23,902	50,613	14,474	17,962	66,332	834,751
Ohio	2,632	1,734	2,616	1,442	91	709	4,551	3,679	23,767	4,819	416	247	7	19	46,729
Indiana	5,609	335	2,597	607	269	409	1,443	37,246	18,208	7,494	47	1,722	49	21	76,056
Illinois	9,086	662	1,034	714	7	2,375	5,517	631,781 [10]	36,738	7,857	2,545	7,529	1,850	19	707,712
Michigan	3,493	3,690	874	1,072	0	1,138	6,313	2,710	47,086	1,285	454	434	0	386	68,935
Wisconsin	8,431	545	306	302	0	264	2,920	9,385	35,459	422	1,603	989	282	1,336	62,224
E. No. Central	29,251	6,966	7,427	4,137	367	4,895	20,744	684,801	161,236	21,877	5,065	10,921	2,188	1,781	961,656
Minnesota	3,270	2,538	100	(7)	0	380	1,869	3,479	36,428	6,591	1,571	401	0	0	56,628
Iowa	7,693	312	41	(7)	86	40	782	17,020	49,010	3,771	4,261	780	189	0	82,975
Missouri	6,286	351	108	132	0	679	1,863	7,478	56,591	3,912	1,178	182	571	0	79,330
N.D., S.D. & Neb.	5,208	298	0	0	0	0	135	1,666	3,875	3,365	2,151	0	0	161	16,859
Kansas	3,991	160	30	10	0	176	267	1,780	29,191	8,440	824	0	11	0	44,880
W. No. Central	26,447	3,659	279	143	86	1,275	4,916	31,423	174,095	26,079	9,975	1,363	771	161	280,672
Kentucky	8,815	59	2,154	897	0	137	120	19,547	53,505	10,502	2,543	(7)	895	32	99,206
Tennessee	16,758	155	1,783	8,907	32	485	528	0	68,200	12,024	31,720	150	1,638	262	142,842
Alabama	17,256	1,706	270	53,403	1,669	295	1,030	(7)	98,753	5,254	116,269	1,188	461	463	298,017
Mississippi	75,470	2,072	25,344	56,807	2,442	0	1,880	0	43,304	2,899	54,703	4,829	1,360	6	270,916
Arkansas	28,205	182	7,273	12,201	0	11	551	(7)	34,966	3,907	3,213	2,504	3,267	3	96,283
Louisiana	24,921	461	15,719	20,091	356	21	300	560	29,337	2,846	13,546	558	655	30	109,400
Oklahoma	748	125	70	141	21	121	472	20,669	11,098	290	1,163	2	5	0	34,925
Texas	29,611	960	931	1,585	0	291	1,141	8,363	104,741	6,322	5,638	102	38	16,212	175,935
South Central	201,784	5,720	53,544	153,832	4,519	1,361	6,022	49,229	443,904	44,044	228,705	9,333	8,519	17,008	1,227,524
Mont., Idaho, Wyo.	730	10,011	0	399	0	0	60	30	26,476	18,141	565	1,046	0	6,808	64,066
Colo., Utah, Nev.	3,136	5,013	5	86	0	0	504	0	14,086	7,778	4,147	118	13	1,668	36,556
New Mexico	1,155	307	32	0	0	0	125	0	5,266	1,022	3,260	0	0	0	11,167
Arizona	7,987	974	1,809	2,730	2,193	20,981	3	0	3,990	4,107	1,883	15	7	3,714	50,393
Washington	3,443	15,959	130	1,265	28	1,866	2,395	(7)	26,272	2,386	6,537	976	112	3,068	62,437
Oregon	1,582	29,126	995	1,142	0	0	781	0	17,530	1,199	4,791	862	307	7,410	65,725
California	66,187	82,246	7,031	12,313	40,116	44,070	34,285	29	46,041	10,409	95,625	678	6,250	506,220	951,500
Western	84,222	141,636	10,002	17,935	42,337	66,917	38,153	59	139,661	45,042	116,808	3,695	6,689	528,688	1,241,844
Continental U.S.	367,093	165,622	102,963	403,404	110,351	89,432	120,326	774,102	1,819,500	161,254	418,074	43,013	38,780	615,521	5,029,435
Territories	7,525	43,107	25	556	438	0	0	13	1,851	31	4,231	4,594	3,722	2	66,095
Total	374,618	208,729	102,988	403,960	110,789	89,432	120,326	774,115	1,821,351	161,285	422,305	47,607	42,502	615,523	5,095,530

1 Includes distribution by Government agencies. Exclusive of liming materials.

2 Uramon, Cal-Nitro, calcium nitrate, urea, ammonia and nitrogen solutions.

3 Castor pomace, 3,423; sewage, activated and other, 74,011; blood, 1,063; cottonseed meal, 28,978; soybean meal, 305; tung nut meal, 93; linseed meal 90; tankage, processed 2,724; animal 2,298, garbage 217; fish scrap and meal, 2,083; peat, 193; compost, 429; other, 4,419.

4 Bone meal, raw, 5,321, steamed, 5,198; basic lime phosphate, 762; basic slag, 230,151; fused tri-calcium phosphate, 28,169; calcium meta-phosphate, 9,235; ammoniated superphosphate, 3,490; ammonium phosphate (16-20), 50,025; (11-48) 18,154; (13-39) 7,068, fused calcium magnesium phosphate, 59,178; phosphoric acid, 4,324; other, 1,230.

5 Manure salts (16-30%) 14,982; wood ash, 4,368; sulfate of potash, 7,286; flue dust, 3,825; tobacco stems, 3,711; sulfate of potash-magnesia, 6,282; cotton hull ash, 1,809; potassium carbonate, 19; nitrate, 110; other, 50.

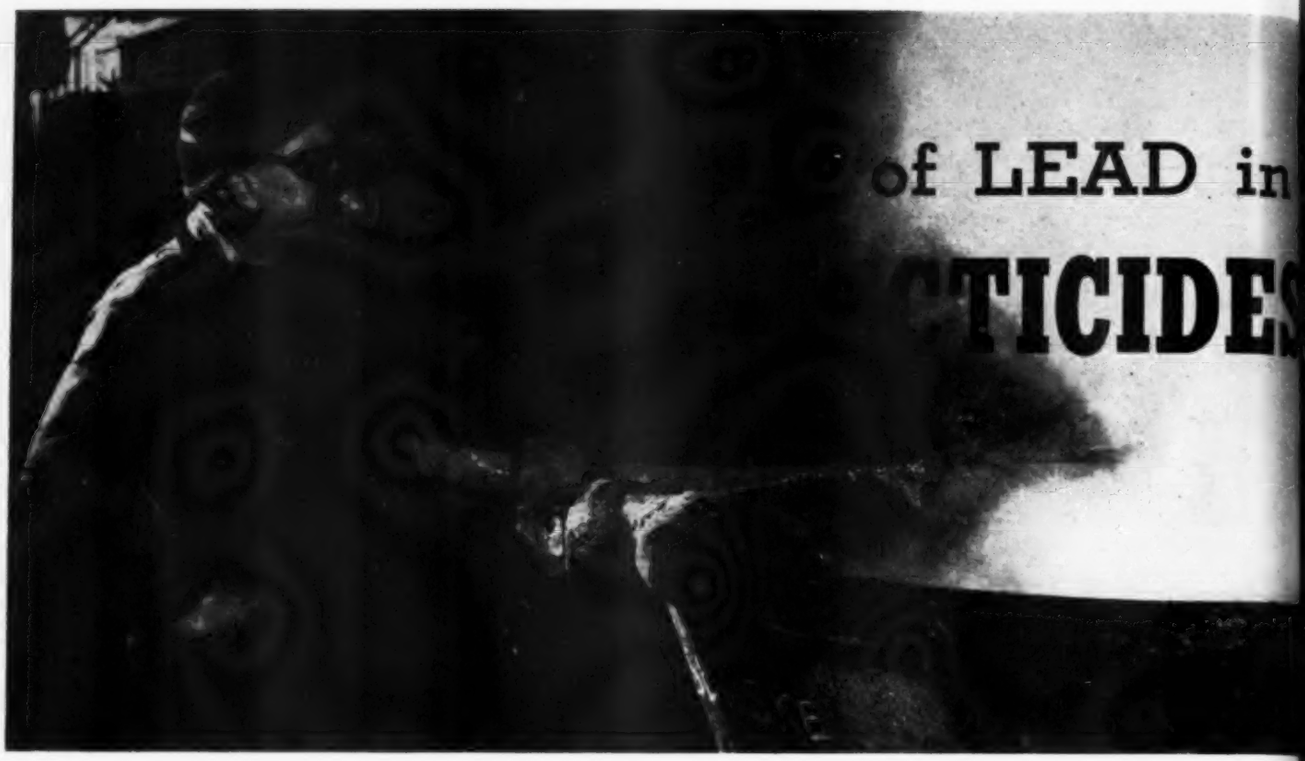
6 Gypsum, 544,829; sulfur, 40,847; borax, 4,570; copper sulfate, 762; manganese sulfate, 366; magnesium sulfate, 264; zinc sulfate, 597; iron sulfate, 287; aluminum sulfate, 54; undistributed, 22,947.

7 Reported by less than three companies, included with "others."

8 Small tonnage included with "18-21% superphosphate."

9 Total for region where possible, otherwise column total.

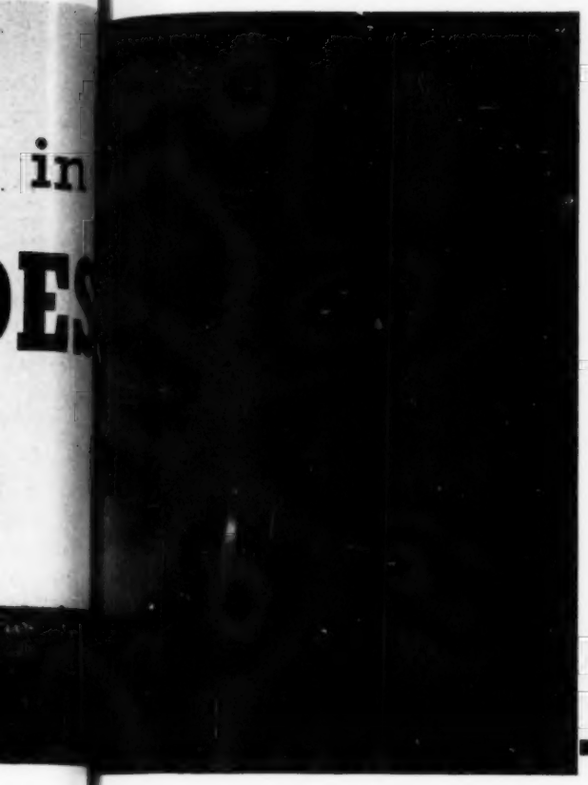
10 Usage in Illinois in 1945-46 was about 380,000 tons, or 100,000 tons more than shown in last year's report.



# of LEAD in
TICIDES

DIFFICULTIES being experienced by insecticide manufacturers in producing raw materials from which to make lead arsenicals and the consequent shortage of lead insecticides, stem entirely from an acute pig lead shortage. This is one of the most critical commodity shortages in the United States. Therefore, a proper understanding of the lead situation will indicate when and how relief may be expected. As soon as the lead shortage is cured, the supply available for conversion to lead arsenate may be expected to increase in proportion.

The pig lead shortage today is an excellent illustration of what Government controls on prices, profits, production, distribution and imports can do when they supplant the operations of a free market in a commodity of international importance. The elements in the lead situation are easy to grasp. In the first place, lead has wide application in industry and is so extraordinarily useful that in times of great business activity, as today, the demand for it is exceptionally strong. For example, the automotive industry needs large quantities of lead for the construction and continued operation of automobiles, in storage batteries, solder, bearing metals, brake linings, and in the very gasoline which propels them.



by

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The building industry, as is well known, requires large amounts of lead in the form of paint, both white lead and red lead, in plumbing, and in sheet lead wherever sulphuric acid is used. The public utility industry consumes large quantities in cable sheathings for telephone toll and power lines.

Even the food industry in the United States needs large tonnages of lead, both as the insecticide—lead arsenate—for spraying fruit trees, and as ammunition for the farmer to supplement his food supply and to cut down depredations by predatory animals. There are a number of other important uses, too detailed to mention here. In the aggregate I estimate that, if it were available, industry could consume today, in the United States alone, more than 1,250,000 tons of lead per year. This continued the wartime trend which set a mark of well over 1,000,000 tons per year for a period of six years, from 1940 to 1945 inclusive.

To satisfy such a huge demand for the metal there are four sources of supply open:

1. Domestic mine production,
2. Domestic scrap or secondary lead recovery,
3. Imports, and
4. Government stocks, or private stocks.

The fourth source we can dismiss at once, as the Government stockpile is only around 1,600 tons and it is not likely that this amount will be made available to industry.

Let us analyze the situation in each of the other available sources of supply as seen in the remainder of this article.

Domestic Mine Production

BY dint of extraordinary effort and the sacrifice of their ore reserve position, many lead mines were able to keep production keyed up to a relatively high pitch during the war and succeeded in producing close to 500,000 tons in 1942. Thereafter, however, owing to progressively serious serious labor shortages, production declined until in 1946, only 332,000 tons of lead were produced. With improved labor conditions and removal of Governmental controls, production increased to 375,-

000 tons in 1947 and may reach 400,000 tons this year although the mines could still use nearly 10 per cent more labor than they now have.

In addition, lead mines were operated under a subsidy system until June 30, 1947, whereby most mines were paid a bonus above the ceiling price of 8.25c per lb. The bonus ranged from 1c to 7.50c so that the top price received by some mines was 15.75c. This system encouraged inefficiency, but now with ceilings removed the free market price for lead of 17.50c per lb. exceeds the maximum premiums previously paid and is encouraging production and exploration for new ore.

Last year's record production of secondary lead not likely to be repeated in '48 because of low stockpile in possession of scrap dealers. Mines expected to produce 400,000 tons this year, and imports may equal the 200,000 tons received in 1947

Scrap or Lead Recovery

NOW let us turn to secondary or scrap lead production. This is an extremely important source of lead and generally accounts for a fairly steady annual tonnage of between 300,000 and 350,000 tons of lead per year. Please note that this tonnage corresponds closely to the tonnage extracted from the lead mines themselves.

An interesting situation has developed, however, since the end of price ceilings in November, 1946, which reveals the power prices exercise over supplies. When the 8.25c per lb. OPA price ceiling was terminated, lead gradually rose to 15c per lb. in March 1947, where it remained until it advanced to 17.5c per lb. in April 1948. These higher prices brought a rush of lead-bearing scrap into the market, resulting in a record production of slightly over 500,000 tons of secondary lead in 1948, exceeding domestic mine production by more than 100,000 tons. It is unlikely that secondary lead production will reach such an extraordinary figure in 1948 because much previously hidden scrap has already been disposed of and scrap dealer's stocks have probably been greatly reduced.

Imports

NOW let us look at the third source, namely, imports. A great change has taken place in the lead economy of the United States. Before the war, lead production and consumption were in balance and imports were of minor significance. During the war, however, American industry demonstrated its capacity to consume such large amounts of lead that the United States mines, plus the scrap, were no longer able to supply the demand, so large tonnages of lead in both merchantable pig form and in ores and concentrates were imported. In 1942 close to 500,000 tons were imported in that fashion and for the six years 1940 to 1945, imports averaged 349,200 tons per year.

Here, again, however, an important Government control stepped in. The Government became the sole importer, during the war. Private imports were forbidden. Then it was revealed after the War that the Government had an informal understanding with England to limit its imports into the United States. Hence, the imports of lead coming into the United States in 1946 totaled only 157,000 tons and this despite the fact that lead was available in Mexico, Canada, Australia, Peru and elsewhere if American companies were permitted to buy it. This agreement was terminated and imports again increased in 1947 to over 200,000 tons. What they will amount to in 1948 depends, at least in part, on the impact of the European Recovery Program. It is likely that the imports will at least equal 1947.

These are the facts in the lead situation. Despite the continued serious shortage of lead, it is obvious that lead supplies from every source—domestic mines, scrap and imports—have all increased as artificial Government controls have been removed. A free market is providing the incentive to increase production and to search for new sources of lead for every purpose.

The shortage has been created by the unprecedented demand for lead products which are so useful in everyday peacetime life and by the need to fill the pipe-lines which were emptied of lead products by the war. If the problem of shortages is to be licked, the tendency to return to Government controls must be resisted. It is always easy to let some one else shoulder one's problems but probably the soundest way to solve them is within industry itself working in a free market under the natural laws of supply and demand.

Although insecticide manufacture does not loom among the largest outlets for lead, it has been for years an important chemical product of lead, utilizing about 25,000 tons of of lead each year. Newer insecticides may displace lead arsenate in part, but I feel strongly that, so long as it is necesary to use lead arsenate to produce a part of our food supply, the industry should leave no stone unturned to see that the lead industry is given an unhampered opportunity to supply those needs.★★

Chemical & Flame

WEED KILLERS

by

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RESEARCH and field trials of chemical weed control measures in the last three years have made possible some suggestions for weed control in certain vegetable crops. In these crops, a satisfactory control of weeds depends upon the response of the crop plant to the herbicide used and the type of weed infestation. This paper will pertain to some of the newer chemicals and recent developments in methods of application.

Pre-emergence treatments, i.e., treatments applied after seeding but before the crop plant has appeared above the soil, offer distinct possibilities in many crops. This is especially true in crops where the tolerance of the crop to herbicides is limited or entirely absent. Such treatments can be successfully used in onions, carrots, asparagus, and other crops whose seeds germinate slowly. Under such conditions, a heavy weed growth prior to emergence of the seedlings may interfere seriously with the growth of the vegetable and, in some cases, may destroy the seedlings. Chemicals which are useful for pre-emergence must be either non-toxic to the germinating crop seeds or readily broken down in the soil to non-toxic residues. Among such chemicals are sulfuric acid, cyanamid, the dinitro herbicides, stoddard solvent, and others. Successful pre-emergence treatments are dependent upon the germination of weed seeds before that of the crops. This condition may be effected by early preparation of soil and, whenever possible, a slight delay in seeding. In some seasons, however, this procedure is of limited usefulness because of late frosts or wet weather.

Pre-emergence treatments of corn with 2,4-D have given promising results in the last season. Such treatments may reduce the number of annual weeds which appear to such an extent that cultivation for the control of these weeds is not necessary. It may also contribute to a considerable reduction in the number of annual grasses which appear. There are some weeds, however, such as smart weed, that do not respond in a satisfactory manner to the application of 2,4-D at rates that are considered safe for corn. There are some indications that sweet corn is perhaps more tolerant of 2,4-D than field corn. This, however, could be a characteristic of certain varieties and may not hold true for all corn varieties. Further study of this problem is required. Based on last season's results, it appears that rates of 1-2 pounds of actual 2,4-D acid per acre may be applied to corn fields as a pre-emergence treatment without injury to the stand of corn or yield of grain.

2,4-D in Other Crops

THERE have been a number of reports concerning the use of 2,4-D as a pre-emergence treatment for broad leaf crops, but the results obtained are not consistent and appear to be affected by soil types, soil moisture and the nature of the crop plant to such an extent that such usage appears to be questionable at the present time. Further study may show that the material can be used in this way, but the data do not warrant suggestions in regard to general usage for the coming season.

Pre-emergence treatments of sugar beet fields, utilizing petroleum products of various kinds and other chemicals, have been reported from western areas but have not been tried under Michigan conditions. It is our opinion that any weed control treatment cannot be properly evaluated until it has been used on the prevailing soil types and climatic conditions in the area in which such usage is proposed. A research program on sugar beet weed problems will be undertaken in Michigan in 1948.

There have been some advances in the selective spraying of 2,4-D in corn and small grains. In previous years, the emphasis has been on finding how much of the chemical could be used in these crops without injuring the crop plants. The present trend seems to be toward using as little of the chemical as is possible and still obtain weed control. This seems to be a desirable approach in view of the fact that varietial differences are being found in grains as well as corn. In certain crops, the use of 2,4-D has been found to affect quality of the product as well as the growth of the vegetative plant. The use of low volume-low pressure-high concentrate sprays appears to be desirable in an attempt to minimize the risk of producing such effect in addition to being a desirable method from the standpoint of water requirements and speed of operation in applying the material.

The fact that the response of corn and grain to 2,4-D is dependent upon the rate of application and stage of growth of the crop plants has led to the suggestion that from ¼ to ½ pound of actual 2,4-D acid per acre is the safe range for selective spraying of these crops. The volume of water used will depend upon the type of equipment which is available to the grower. Corn should be sprayed when it is from 10-20 inches tall; small grains should be treated at full tiller but before jointing has begun.

Small grains which have been seeded to legume crops may not be safely sprayed with 2,4-D in any concentration. Mustard and other annual weeds in such seedings can be controlled, however by spraying with the di-nitro herbicides. These materials have but little effect upon perennial plants and, if an infestation of perennials is present, the grower may choose to sacrifice the interplanted legume for the sake of eliminating a harmful weed. In such cases, 2,4-D is desirable at a rate sufficient to kill the weed species present; or in the case of resistant species, it should be applied at a rate sufficient to retard growth and prevent seed formation by the weed plant.

Quackgrass Control

SELECTIVE control of quackgrass has been the subject of considerable research and discussion. The use of iso-propyl phenyl carbamate for this purpose has not proved generally satisfactory. The low solubility of the chemical in water and the difficulty in getting it into contact with the grass rhizomes have contributed to the unsatisfactory results. It appears now that a great deal more experimental work and probably the use of other chemicals, will be required to establish a satisfactory control program for this plant. It should be pointed out that iso-propyl phenyl carbamate is not a specific for quackgrass and will have more general effect upon forage and pasture grasses than upon quackgrass. Certain other soluble chemicals have been made available in small quantities for use on quackgrass and some of these appear to be effective in reducing the growth of quackgrass when applied to the soil. It is not expected that these will be available in commercial quantities this season and further trials are needed to establish dosage rates and crop plant response to the chemicals.

Cyanamid which has been used for a number of years as a weed control chemical in asparagus production, has been used experimentally in a number of other crops. The formulation of water soluble forms of cyanamid may lead to the extension of the use of this chemical. The effects of the soluble forms on growth and maturity of crop plants has not been determined fully and further trials are necessary to determine these effects.

Role of Flame Control

USE of flame for the control of weeds in fence rows, roadsides, and other areas has been practiced for a number of years. This procedure is valuable for the destruction of weed growth which may harbor insect pests and plant disease. Within recent years, the selective use of flame has received considerable attention. The method has proved successful in weeding cotton, corn and sugar cane. However, limited trials in vegetable crops have shown that most tender vegetables will not tolerate the heat generated by weed burners. At the same time it is known that certain woody stemmed vegetable crops may tolerate flame cultivation.

The chief objections to the use of flame are the fact that the method is applicable to only a small group of plants and to the fact that the presently available equipment is both large and expensive. The degree of weed control that can be obtained is dependent largely upon proper adjustment and the skill of the operator, The necessary skill in operation can be obtained only by experience and at the present time, there are but a few experienced operators available.

The pre-emergence usage of flame control appears very promising on some soils. This method has been used on muck soils with satisfactory results in early spring when the moisture supply is abundant. But the use of flame on dry muck is extremely hazardous because of the possibility of setting fire to the soil. Such fires are very difficult to extinguish and can completely destroy the usefulness of such soil. Mineral soils, however, can be treated with flame without risk and this method should be useful in slow starting tender crops in wet seasons when weed destruction is difficult by the usual discing and dragging operations that precede seeding. As in the case of chemical treatments, the benefits obtained by pre-emergence flaming can be lost by a too early cultivation of the soil.★★

Pre-emergence treatments show great promise in many crops. Use of 2,4-D may reduce the number of annual weeds so that cultivation is unnecessary. Further research under way

Invisible Injury to Plants may result from improper use of

INSECTICIDES

By

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THE purpose of any agricultural insecticide is to control populations for the protection of valuable crops. Yet it should be remembered that although an insecticidal material may be efficient and cause no visible injury to plants on which it is used, this is still no guarantee that the plant may not sustain invisible (internal) injury. Unfortunately, this is a condition all too often overlooked. Internal effects, of course, may be temporary or they may be cumulative to the extent that they may become permanent and visible. Some of the less apparent injurious effects of insecticides on plants are as follows: interference with the loss or retention of water, the exchange of gases (carbon dioxide and oxygen); the manufacture of foods, and the transfer of foods from one part of the plant to another. Insecticides may also be responsible for the accumulation of toxic residues in plant tissues. Any one or more of these factors may have a temporary or permanent retarding effect on the growth of the plant, lower its food value, or even prevent its use as food. Omitting then, except for occasional mention, the plainly visible effects of insecticides, such as leaf and fruit scalding, spotting, deforming and dropping, let us turn our attention to some of the less conspicuous effects.

Excessive Loss of Water

WATER escapes from a plant in the form of vapor, and gases enter or escape from green leafy plants almost entirely through the leaves. The leaf surfaces are covered with a waxy layer, almost impermeable to water, but in this layer, on only one side or on both sides of the leaf, are many minute pores or openings. Each of these pores is surrounded by two cells (guard cells) which regulate the size of the openings during the day and close them at night.

Insecticides may cause excessive loss of water from plants in at least two ways. For example, dusts and certain sprays contain finely divided particles which may become wedged between the guard cells and keep them from closing the pores. Again, if the spray or dust contains an alkali such as lime it may combine with the waxy layer and make it more permeable to water. Both of these conditions may permit excessive loss of water, even to the extent of causing the plants to wilt. The excessive losses of water may cause internal injuries which may later produce visible injuries, such as leaf and fruit scorch and drop. Injuries of these kinds are most likely to occur when high temperature, low relative humid-

ity, and rapid wind movement prevail during or soon after the application of the insecticide.

Excessive Retention of Water

THE same insecticides that prop the pores open and cause the plant to lose abnormal amounts of water may cover and plug the pores and thus reduce the escape of water excessively. Oil sprays also reduce the loss of water by making the waxy layer itself even more impermeable to water vapor, or the oil may enter the pores and form a covering over the walls of some of the cells below each pore. These effects of the oil are especially noticeable in the portions of the plant that are shaded, because under such conditions the oil remains on or in the tissues longer. Interestingly enough, an excessive decrease, as well as an excessive increase, in water loss from the plant appears to be another one of the factors ultimately responsible for leaf and fruit drop. This condition of decrease in water loss appears to be responsible also for abnormal growth activity. For example, it may cause an increase in the prevalence and severity of granulation in citrus fruits. Many of the juice sacs enlarge, become hard and lose at least most of their color.

In addition to causing the loss or retention of excessive amounts of water vapor, insecticides may in the same manner influence the rate at which gases, mainly carbon dioxide and oxygen, enter or escape from the plant. Carbon dioxide is one of the foundation substances used by green plants in manufacturing foods. If an insecticide prevents the plant from receiving an adequate supply of carbon dioxide, the amount of food that it can manufacture during the day will be reduced. Equally important, an adequate supply of oxygen is just as necessary for the life of the green plant as it is for the life of human beings or other animals.

Manufacture of Foods

THE minute bodies in the cells, located principally at or near the surface of the leaves and which contain the green coloring matter, are the little "mills" in which food manufacture begins. The energy which drives these mills is derived from sunlight. Food manufacture begins in the plant when the little bodies containing the green coloring matter bring about, with the aid of sunlight, the combination of carbon dioxide and water to form sugars. The more complex foods are formed later, with sugars as the starting point. Some insecticides, in addition to impeding or preventing the entrance and exit of gases, tend to destroy or retard the formation of the green coloring matter in the leaf. If then, the plant does not have access to adequate supplies of any one or more of these necessities, it cannot form the sugars, starches, proteins, etc., which are indispensible for its growth and for food storage in seeds, roots, tubers, etc. Some of these reductions are great enough to be detected by taste. For example, the amount of sugar formed may be reduced to the extent that the edible portions of the plant do not have their usual degree of sweetness. Again, the amount of acids may be reduced so much that the tissues or juices taste insipid or even nauseating. The acid-reducing effect is especially noticeable in oranges that have been sprayed with some forms of arsenic. Reduction in weight and size of fruit, root, or tuber may also occur. It is not difficult to understand, therefore, how insecticides can upset the normal functioning of the plant. Any material which reduces the amount of green coloring matter, interferes with the proper exchange of water vapor and gases by plugging the pores or by propping them open, and coats the leaf so that too much light is excluded, will certainly disrupt normal development.

It has been found also that some insecticides or their products may penetrate into the tissues of the plant and have a direct injurious chemical effect. These substances may gain access to the internal tissues not only through the pores but through mechanical cracks and insect punctures or abrasions in the waxy layer.

The following are some of the insecticides that have been found to produce one or more of the objectionable effects just mentioned: petroleum oil, petroleum oil plus fluorine or lead arsenate, lead arsenate, lime sulfur and sulfur.

Internal injury to plants not always visible. Such injuries may interfere with the plant's retention of water, exchange of carbon dioxide and oxygen, manufacture and transportation of foods, or may cause the accumulation of toxic residues in tissue

Transfer of Foods

INSECTICIDES may not only affect growth by reducing the amount of food formed, but they may also slow down or prevent the action of certain substances (enzymes)

No over all rule applies, since plants do vary greatly in susceptibility to different insecticides. Probable that new organic insecticides may be inclined toward internal injury rather than more obvious symptoms like curling leaves or color changes

which change the complex foods into simpler forms so they can be transferred from the places of manufacture to regions where they can be used for further growth of the plant, or to the areas where they are normally stored. This condition brings about excessive accumulations of foods in the places where they are originally formed and as a result causes a decrease in the amount of food that otherwise would have been produced.

Accumulation of Toxic Residues

SOME poisonous insecticides may not only directly affect the vital processes of the plant but may also accumulate in the tissues in such large quantities that the plant cannot be used as food. Selenium and selenium compounds and some forms of arsenic are in this class. Plants are especially selective with reference to such compounds as these; some will accumulate almost none while others will accumulate large quantities. Injurious effects may be produced also by excessive accumulation in the soil of such insecticides as these and others. Kerosene emulsion which was found to be effective in killing certain insects showed no apparent injurious effects on the foliage but sometimes proved to be disastrous because it ran down the trunks of the trees and killed the bark just below the surface of the soil.

Dwarfing Effects

IN order that a plant may grow, its cells must divide and enlarge. If food and water supplies are deficient, the cells cannot normally increase in size, even though they do divide. Such conditions as these would, of course, cause a dwarfing or stunting of the plant. These dwarfing effects may be temporary, in which case they are seldom noticed, or they may be cumulative and permanent, although they may not be detected for some time. Some insecticides are reported as having a stimulating effect on the growth of the plant (toxic substances in small doses usually have) but it is probable that most of them in the amounts applied have either a temporary or permanent depressing effect. Petroleum oil, petroleum oil plus fluorine or lead arsenate, lead arsenate, Bordeaux, copper silicate, the clays (used as carriers), lime sulfur and sulfur are insecticides that are known to have a temporary or permanent dwarfing effect upon some plants.

Whether the plant will be visibly or invisibly injured or remain uninjured, depends not only upon the nature of the insecticide but on the condition of the plant at the time the insecticide is applied. For example, orange fruits that have attained almost maximum size but are still green in color will absorb 4 to 6 times as much hydrocyanic acid as they will a few weeks later when they are mature and orange in color. Orange trees are usually fumigated at night but if they are fumigated during the day the leaves will absorb more hydrocyanic acid at 10:00 A. M. than at 8:00 A. M., and more at 1:30 P. M. than at 10:00 A. M.

As has been indicated already, some plants may be selective in that they absorb more of one insecticide than another. Insecticides show similar characteristics in that they produce different or selective effects. That is, they may injure some kinds of plants and kill some kinds of insects but not others. It is probable that these characteristics will apply more often to the new organic insecticides that are being tested at the present time than to the inorganic substances of the past or present. It is also possible, if not probable, that the new insecticides may produce internal rather than readily visible external injuries to the plant. The large number of new insecticidal compounds now on the market, with an almost unlimited number in the offing, make it doubly important that their temporary or possibly permanent internal effects on the plant be determined.

The manufacturer and retailer also have a responsibility. A new insecticide should not be offered for sale just because it kills insects. Its effect on the plant should be determined before it is placed on the market, and then only after taking necessary precautions. Such studies should be made and such precautions taken because all animal life depends on the proper functioning and growth of crop plants.

This is a brief presentation of some of the less commonly noticed but very important economic effects produced in plants by insecticides used in the past, or in use at the present time. *The grower wants the cheapest and most effective insecticides, but he should remember that in the long run the cheapest may prove to be the most expensive.*★★

Role of Minor Fertilizer Element . . . .

MOLYBDENUM

By Arthur Linz
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THERE are prolific amounts of literature on the subject, "The minor elements and their relation to plant and animal nutrition." Upon reviewing the bibliographies and abstracts on the subject, it is found that molybdenum is usually mentioned. A great deal has been done by numerous research workers throughout the world to determine the function and value of molybdenum in plant life and growth.

While it is true that molybdenum is an important soil nutrient which needs to built up in areas where it is deficient, most agricultural land in the U.S.A. seems to have ample quantities of the element. The soils in some localities have been found wanting in molybdenum and other plant foods and in these cases efforts have been made to restore a balance. It should not be inferred from this article that molybdenum deficiency is by any means a general situation in any agricultural area in the U.S.A.

From work done in the Laboratory for Bacteriology at the Government Biological Institute for Agriculture and Forestry, Berlin, Germany, Dr. H. Bortels published an article, "Molybdenum as a Catalyst in the Biological Compounding of Nitrogen," in the April 1930 *Archiv Fur Mikrobiologie*. This comprehensive paper is summed up with the statement, "Molybdenum has an especially favorable effect on the growth of Azotobacter chroococcum in nitrogen-free nutritive solution. The possibilities which arise herefrom for nitrogen compounding and the spreading of Azotobacter in soil have been set forth."

In 1938 Mr. G. H. Riddle and associates, incorporated as Research Foundation, Inc. (of Delaware), published two voluminous reports entitled, "The Minor Elements, Their Occurrence and Functions in Plant Life with Reference Abstract Bibliography," and "Elemental Assimilation by Plant Life with Reference Abstract Bibliography.". This organization conducted laboratory as well as field tests which included a fertilizer supplement referred to as "A mineral mixture containing sixty-four of the so-called 'minor elements' in substantially *water-insoluble* inorganic form." In one of their reports they state, "The sixty-four 'minor elements' which have been incorporated in the 'mineral mixture' consist of all the elements found in plant life which could justifiably be called 'minor elements' on account of their quantity occurrence. The majority of them have already been investigated by numerous authorities in agronomy and plant physiology and have been proven to be stimulating to all kinds and types of plant life experimented with, if properly used, and likewise proven to be toxic if used in excess quantities. Such tests were conducted with *water-soluble* forms containing these element." These tests included a number of experiments with molybdenum.

It was the contention of Mr. Riddle and his associates that the chief reason why so little progress has been made in the practical application of "minor elements" is because, as they point out, "such tests were conducted with water-soluble forms." They suggested that, if the "minor elements" were introduced into fertilizer in substantially the percentages and the form in which they are generally found in the soils, any plant life requiring one or more of these "minor elements" would help itself through the processes of nature.

In connection with molybdenum, one might assume from this that if the vegetation required molybdenum the function might have something to do with its action as a catalyst in the biological compounding of nitrogen, as pointed out by Bortels.

A useful reference is the very comprehensive bibliography of references to the literature on the "minor elements" and their relation to plant and animal nutrition originally compiled by L. G. Willis, Soil Chemist of the North Carolina Agricultural Experiment Station, which has been published and distributed by the Chilean Nitrate Educational Bureau, Inc.; and the three supplements to this major work, including a botanical index of the third edition of the bibliography. In addition to this comprehensive work many special articles

Abundant evidence in literature indicates many nutritional diseases may be caused by a lack or excessive amounts of minerals. Data are not sufficient to draw final conclusions. Results of experiments with Molybdenum have been variable; further work remains to be done

have appeared relating specifically to to molybdenum. Among these are:

1. "Studies on the Distribution of Molybdenum on Biological Material, Spectographic study of the Occurrence of Molybdenum in plants Grown in the Province of Quebec," from the *Canadian Journal of Research,* 1934, by Diwall, McKibbin and Beans.

2. "Relation of Accessory Growth Substances to Heavy Metals, including Molybdenum, in the Nutrition of Aspergillus Niger," by Steinberg, in the *Journal of Agricultural Research,* volume 52, No. 6, 1936.

"Molybdenum and Its Effect on the Growth of Lettuce," by Warington, in the June 1947 edition *Victory Farm Forum,* published by the Chilean Nitrate Educational Bureau.

Only one commercial fertilizer firm markets a product with the specific statement that it contains molybdenum. This is the product produced by the Sewerage Commission of Milwaukee, Wisconsin, under the name of "Milorganite." Since their analysis of trace elements includes the statement, "Molybdenum also present," and since they give figures for those trace elements which are present in 150 parts per million or more, it is assumed that the amount of molybdenum present is less than this figure.

In conclusion, we quote from the U.S. Department of Agriculture, Miscellaneous Publication No. 369, March 1941, by K. C. Beeson: "The nutritional value of such inorganic elements as calcium, phosphorous, iodine, copper, and iron have been demonstrated by many investigators, and it is generally recognized that quantative variations of these elements in foods and feeds are important factors in human and animal health. These and other mineral elements, especially those occurring in *trace amounts,* are receiving greatly increased attention in both popular and scientific literature dealing with soils, fertilizers, plant growth and composition, food quality and animal and human health and nutrition."

"It is also significant that greater and greater emphasis is being placed on the problems of the interrelationships among these fields of investigation. It is believed and the evidence will be cited in this review, that many nutritional diseases are caused by deficiencies or excesses of particular minerals in food plants grown in different soils, in different localities, and with different cultural practices. Although there is abundant evidence, as shown by this literature survey, that these relationships are real and profound, the data are wholly insufficient for defining such relationships in definite practical terms that can be translated into recommendations for agricultural practice on specific soils for the culture of specific food plants. Aside from the fact that the many unsolved aspects of this problem are certainly responsible for much poor nutrition and poor husbandry, this kind of situation is leading to all sorts of conjecture on the part of the public and many unwarranted claims in regard to the special advantage or possibilities of certain soils, fertilizers, and food plants. The Department of Agriculture does not have the necessary facts to judge all of these claims."

From the above it will be seen that this whole subject is still in the experimental stage. For example, in the latest work of Dr. Warington referred to before, she states, "Response to the molybdenum treatments, however, was variable. In some cases, striking improvement in both color and dry weight occurred when the element was supplied, while in others the benefit showed itself in an increase in dry weight only. Attempts to correlate these responses with season, however, were very disappointing, as the peak periods were not the same in the two series. Seasonal influence, therefore, cannot expand the variability in the degree of response to molybdenum, but there seems no doubt that this element is an important factor in the nutrition of lettuce, even though the precise nature of this influence remains to be discovered."

The use and application of molybdenum in the field of agricultural chemicals is in our opinion still in the experimental stage.★★

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New Books . . .

"A Catalogue of Insecticides and Fungicides. Volume I. Chemical Insecticides" by Donald E. H. Frear, 203 pages, The Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, Inc., New York City. 1947. $6.50

THE author has compiled a list of all of the chemicals on which published insecticidal tests were available up to 1944, as well as many materials on which he obtained such information from private sources. Most of the materials of plant origin are omitted from this volume and are to be included in Volume II, together with the fungicides. The information given for each material includes the usual name, synonyms, formula, insects on which tests were made, order of toxicity reported, and sources of information.

A number of major difficulties inherent in such a compilation, in addition to the tremendous care and labor involved, have been well handled. The diversity of test insects, test conditions, formulations, concentrations, and methods of expressing results in reported work makes valid comparisons difficult. The author has set up arbitrary orders of highly toxic, medium toxic, slightly toxic, and nontoxic, based on the percentage kill reported whatever the test conditions. Where figures have not been reported, the designations are simply toxic or non-toxic. This information, together with copious references to the original sources of the data, permits the reader to draw his own conclusions as to the value of a given material.

It is of course impossible in such a compilation to give complete bibliographies for some of the better known insecticides, which would require several thousands of references for complete coverage. For such compounds the author takes the only feasible course of listing a few key references to summaries, bibliographies, and particularly significant pieces of work. This necessary incompleteness detracts little from the value of the compilation, since the chief advantage of the work lies in the complete listing of the less common compounds which might easily be overlooked in brief examinations of the literature.

The greatest difficulty lies in the classification and indexing of the compounds listed. A simple alphabetical list is to be included in Volume II, but is of limited usefulness because of the frequent possibility of naming a given compound in several different ways, each chemically correct, as well as the widespread use of coined, abbreviated, or trivial names indicating little or nothing of the structure. The usual methods of classifying compounds, particularly organic, are in many respects unsatisfactory when biological action is in question. Many groups which have been shown to give similar biological action when substituted into a variety of hydrocarbon types are usually classified in widely scattered places as derivatives of the separate hydrocarbons, and conversely many groups considered closely related chemically may react very differently biologically. Dr. Frear has devised a comprehensive coding system designed to overcome these drawbacks and to place each compound of known structure into a unique position.

Each of a large number or chemical groups and structures is assigned an arbitrary code number. The lowest numbers are assigned to those groups having the largest number of elements present, and the highest to the details of the hydrocarbon skeleton for the organic compounds. The inorganic compounds are assigned still higher code numbers. Under the groups having similar elemental content, specific groups are placed in arbitrary order for coding. The code numbers for a given compound are chosen by locating the lowest number in the list which will apply to its structure, then the next lowest, and so on until all coded details are listed. The system is explained in some detail in the Introduction to Volume I so that one with a reasonable knowledge of elementary organic chemistry can locate almost any desired compound of known or partially known structure, after a little study and practice.

The system has shortcomings, as any such system must. The order of groups in their biological activity cannot be rigidly fixed, so that less important groups may determine the position of some compounds in the classification. The structure of the compound in question must be fairly well known for rapid location, although it can be found in most cases if only partially known. However, the system represents a tremendous improvement over existing classifications of biologically active compounds.

Two supplementary lists are given to include condensation products and mixtures or other materials of complex, variable, or unknown constitution which cannot be fitted into the coded list. The author is to be congratulated on being able to keep these uncoded lists so small.

The value of this work is well expressed in a foreword by F. F. Lininger: "In many cases, the bringing together of known facts is as important a contribution to research as the discovery of new information. . . . The large amount of time which Dr. Frear has spent in the preparation of these volumes will be more than repaid, in the aggregate, by the saving of effort on the part of many individual students and investigators who will be spared the necessity of long and tedious literature searches."

—L. B. Norton
Cornell University

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F.A.O. Yearbook for 1947

The Food and Agriculture Organization of the United Nations has recently issued its "Yearbook of Food and Agricultural Statistics" for 1947. The book is written in both French and English. The preface, written by Sir John Boyd Orr, director-general, states that this book carries forward the work previously done by the International Institute of Agriculture at Rome. It brings up to date the figures previously supplied on agricultural production and livestock numbers and includes numerous revisions in the data for earlier years.

(*Turn to Page* 77)

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The Listening Post

Progress Reports on Plant Disease Control

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

REPORTS indicate that late blight (*Phytophthora infestans*) had ceased to be a factor on commercial tomato crops in Florida generally by the end of March, even though control was applied indifferently or not at all in some sections. Weather did not favor an epidemic in tomato seedbeds in the Sanford area, but uniform scattered infection was evident throughout March and the first part of April. Plants shipped to northern areas were reasonably certain to carry inoculum. By the middle of March shipments were going to South Carolina, Georgia, and and Alabama. Where "Dithane" or copper was used the amount of disease was reduced, but no grower was doing a sufficiently thorough job to have clean plants.

The fungus was still very active on potatoes in the Everglades and Hastings sections. At Hastings more than 8 inches of rainfall were recorded during a two-week rainy period ending March 13, and weather was mostly favorable for late blight development during the rest of the month and the first half of April. Spread was not rapid immediately after the end of the rainy period, perhaps because of the small number of primary infections present and the use of fungicides on the worst-affected fields before it began. At the beginning of April the disease was general but only a few fields not treated before blight became established in them were killed by it. A disastrous epidemic was prevented by fungicide applications. About half the acreage was treated with enough copper or "Dithane" each week to prevent blight losses. The disease caused little or no injury in fields sprayed every five to seven days with about 150 gallons of "Dithane" zinc sulfate-lime per acre, and was also controlled in fields dusted every three to four days with enough copper dusts to cover each acre with three to four pounds of metallic copper once a week. Fungicides used, besides the "Dithane" spray, include "Tribasic Copper," "Copper Compound A," and "C.O. C.S."

In Louisiana, late blight was found in one ten-acre potato field in Terrebone Parish, March 30, and in one small potato planting at Baton Rouge, April 8. These are the only occurrences of late blight recorded in the state this spring. Weather conditions have not been favorable to the disease, with relatively little rain and sunshiny, windy days.

Blue Mold Important

IN Georgia, (*Peronospora tabacina*) spread has been continuous but overall damage has been negligible. The only serious plant loss occurred in the small percentage of untreated beds attacked in early February. Most growers treated their beds regularly with "Fermate." Little of the crop had been set out because of wet fields, and some of the plants had become too large to use.

Scattered beds of cigar-wrapper tobacco showed blue mold in Gadsden County, Florida, but only one case of serious damage was noted. Good control was achieved in spite of frequent rains, by almost daily applications of "Fermate" dust or of "Isotox" and fungicide combination. A considerable amount of leaf distortion was attributed to excessive application of "Isotox" (high gamma benzene hexachloride diluted to 1.5% gamma), either alone or in combination with fungicide. Transplanting had been delayed by rain and by cold weather which retarded growth of seedlings. No blue mold was found in lower East Coast areas in a quick survey on March 16.

In South Carolina, only one affected bed had been reported, on March 15 in Williamsburg County. Use of "Fermate" checked the disease. Stands were generally good but plants were small for the time of year, growth having been slow because of continued rains and cold weather.

In North Carolina, the disease was first found March 23 in a Columbus County bed during a period of warm weather. By April 2 it was found at several other locations in Columbus County, and in adjacent Bladen County. On April 1 it was found in Wake County, on two farms in several scattered beds, both cases on old bed sites, one of which had been treated last fall with the "Uramon"-Cyanamid combination treatment. This is about 100 miles from the Bladen County locations and the disease probably was present at places between. Most cases observed so far have been on old bed sites.

Downy mildew of cucurbits (*Pseudoperonospora cubensis*) was prevalent on cucumbers in several Florida sections. It reached epidemic proportions in the Fort Lauderdale-Pompano East Coast area during the first week of April. On the West Coast, infection varied from moderate to very severe at the end of March. Here, growers with adequate spraying machinery had very little disease; others using hand-operated equipment were losing their plantings before the crop was set. The disease was active in the Webster and Mascotte areas from the middle of March, increasing in severity toward the middle of April,

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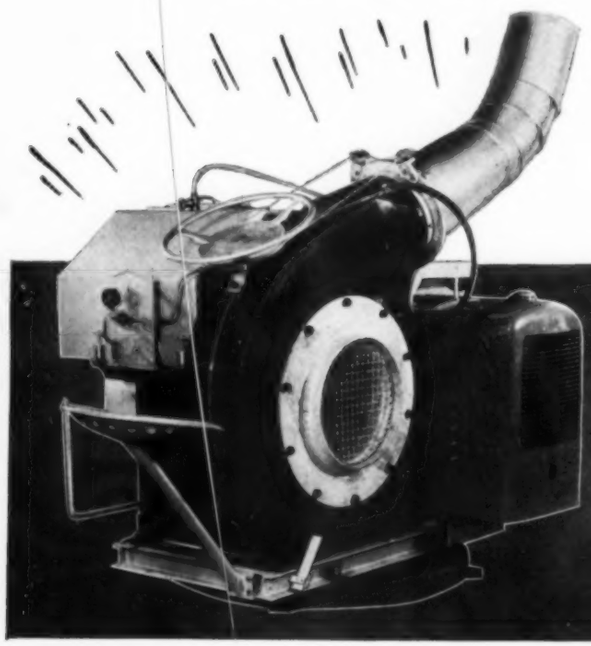

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when it started to kill the plants in poorly dusted fields. In this section copper-zinc-lime dust was giving better control than "Parzate" but much copper burn was evident. The disease was observed to be severe on cucumbers at Wauchula and Arcadia also. Up to the middle of April no downy mildew had been reported on watermelon plantings.★★

Status of Insect Pests During April and May

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Haeussler is in charge of Insect Pest Survey and Information, Agric. Research Adm., B. E. & P. Q., U.S.D.A. His observations are based on latest reports from collaborators in the department's country-wide pest surveys.

By G. J. Haeussler

CODLING moth adults began to emerge during the last half of April in many areas, including Georgia, North Carolina, Kentucky, Maryland, southern New Jersey, Ohio, southern Indiana and southern Illinois. Cool, wet weather retarded emergence of the moths in many areas during the early part of May and no emergence had been reported from New York State or the Yakima Valley of Washington by the middle of that month.

Moths of the red-banded leaf roller were reported as numerous in apple orchards of western New York during the last half of April and this insect was said to be more generally distributed and more abundant than last year in the Hudson Valley area. It was also reported in late April as rather abundant in southern Indiana, and by the middle of May the larval population that had developed in the Vincennes area was reported to be sufficient to develop into a severe infestation if lead arsenate is omitted from first-brood codling moth sprays where DDT is used. The leaf roller is scarce in southern Illinois.

In general, infestations of the plum curculio seem to be heavier than usual throughout the eastern part of the country. The infestation in the Fort Valley district of Georgia was reported as heavier than usual. In southern Indiana the infestation is the heaviest recorded in 22 years. The insect is abundant in southern Illinois and western Kentucky. Light infestations were reported from southern New Jersey during late April, but activity increased there toward the middle of May.

European red mite infestations were abundant during early May in southern Indiana orchards. They were not reported as especially numerous in other eastern orchard areas from which reports were received nor in the Yakima Valley area of Washington.

Populations of the Mexican bean beetle ranged from light to moderate in the South during late April and the first half of May. This pest has not caused appreciable damage elsewhere thus far this season. The seed-corn maggot and garden centipede were causing serious injury to beans in parts of southern California toward the middle of May.

Cabbage caterpillars and aphids were reported as occurring in light to moderate numbers on cabbage and related crops in the South and in southern California during the period.

At the end of April, pea aphid infestations in New Jersey were reported to be considerably smaller than in 1947. A light infestation of this aphid was present on peas in Habersham County, Georgia and in northwestern Tennessee early in May. Insecticide applications to control light to moderate numbers of this pest on peas were started April 29 on the Eastern Shore of Maryland. Continued cool and wet weather has retarded pea aphid development and the planting of peas in the Blue Mountain and Palouse districts of the Pacific Northwest. Moderate numbers of the pea aphid were present on alfalfa and clover in Wisconsin toward the middle of May.

The Colorado potato beetle was unusually abundant during the latter part of April on potato and, in some instances, on tomato in Georgia, Florida, and South Carolina.

Cutworms were causing serious injury to cantaloup and tobacco in Florida and to various vegetables in central Washington early in May. They were severe on beets in South Carolina toward the end of April. Toward the middle of May they were causing moderate to heavy damage to various vegetable and other field crops in New York, South Carolina, and Tennessee.

The six-spotted leafhopper was becoming active as a potential pest of lettuce and carrots in New York during early May.

Moderate to heavy aphid infestations occur on vegetables in the South, particularly on eggplant, tomato, and squash in Florida and on squash in Georgia.

A very few winged aphids were found, after extensive search, on young shade-grown tobacco in Gadsen County, Florida shortly after the middle of April. Apparently these gained entrance into the shaded fields by flight. Toward the end of that month increasing reports were received of the green peach aphid on shade-grown tobacco in Gadsen and adjacent counties. Some of these were traced to improperly treated plant beds, others to winged insects that gained access to the fields or to infested host plants within the shade-fields. The aphid infestations continued to increase in intensity on tobacco in northeastern Florida during early May and were also reported as severe on cigarette tobacco throughout the producing sections of southern Georgia. Intensive insecticide applications appeared, however, to be holding the infestations fairly well in check in most areas.★★

Weeds showing first symptoms of 2,4-D effects. Corn not affected.

A row crop sprayer applying 2, 4-D in sweet corn.

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Technical Briefs

Grasshopper Control

A shift away from the broadcasting of bran-sawdust-sodium fluosilicate bait for grasshopper control is seen in a USDA bulletin recently prepared by J. R. Parker and Claude Wakeland of the Department. Newer methods include the use of sprays or dusts containing new organic insecticides, most promising of which are chlordane and chlorinated camphene. In some cases, they are more effective than bait. In all, succulent growth along roadsides, railroad rights-of-way, canal banks, field margins and in alfalfa, the insecticides kill grasshoppers more rapidly and thus give better control.

Research has indicated that chlordane and chlorinated camphene give higher initial kill, and continue to kill over a longer period, when applied as sprays than when equal dosages are applied as dusts. When using sprays, 1 pound of technical chlordane, or 1½ pounds of technical chlorinated camphene per acre are recommended. Recommended dosages for dusts are 1½ pounds of technical chlordane or 2 pounds of chlorinated camphene per acre. In late season, when most of the grasshoppers are adults and the vegetation is tall and dense, a slight increase in the dosages of both sprays and dusts may be necessary.

Application may be made by ground sprayers or dusters, or from airplanes. The rate of application must be constant to avoid over distribution, or too light an application. Precautions are given not to feed to dairy animals forage which has been treated thus.

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2,4-D Dosage in Corn

One-half pound of 2,4-D acid equivalent is recommended as the maximum safe dosage to apply to growing corn. This amount is sufficient to kill many annual weeds when applied during the rapid growing stage. Perennial weeds cannot ordinarily be killed without higher dosages, from 1 to 1.5 pounds of the actual chemical per acre. Such dosages cannot be used without danger of damage to corn, but may be advisable when the probability of crop failure from weed infestation is likely.

Growing corn should be sprayed whenever possible when it is between 8 and 15 inches in height. Indications are that corn is less tolerant when it is very young, and when the brace roots are forming (about 20 inches on field corn). Later, corn is again more tolerant.

Either the sodium salt or the liquid amine salt formulations of 2,4-D are recommended for best results. The esters of 2,4-D give good control, but corn appeared to be less tolerant of the esters. It was apparent that sufficiently good weed control could be obtained without the risk of using esters.

—2,4-D Report, Dow Chemical Co., Midland Mich.

The corn in above photo was sprayed with 2, 4-D when it was approximately 18 inches tall. The rows at the right are untreated. Note thick growth of weeds as compared to clean rows of treated corn at the left. Corn most tolerant of 2,4-D when it is young. (Photo courtesy U.S.D.A., Beltsville, Md.)

Orange Worm Control

Orange worms show very little activity at the present time as most of the so-called "shortbrood" of Tortrix worms are feeding on the new growth. The generation appearing around the first of June is the one that does most of the damage to valencia organges, both at the coast and in the interior.

Of the four species of worms which feed on organges, *Tortrix* is is by far the most damaging although a comparatively new species called *Pyroderces* has been building up in Orange County recently and becoming of more importance. Control measures as applied for Tortrix are not very successful against Pyroderces.

It is impossible to forecast orange worm damage by the prevalence of the short brood of worms now on the trees or the amount of parasitism present. In the case of valencias as well as navels, a sound program is to treat groves with a past history of damage, especially if the crop is clustered. Control measures may be applied from early May through June and should be completed before the small worms start boring into the fruit.

Satisfactory control on oranges may be accomplished by the thorough application of dusts, May through June, of approximately 90 pounds per acre of 50 per cent cryolite dust or, where spider is also present, a com-

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bination DN-cryolite dust at the same dosage. If a treatment is necessary for orange worms and rust mite, use cryolite-sulfur dust at the same dosage. Drive not in excess of four miles per hour.

Where spraying is preferred, cryolite may be used with water at the rate of 3 pounds per 100 gallons. A rather thorough application should be made to assure the best possible coverage of the fruit clusters. Its combination with nicotine sulfate and lime sulfur is not recommended, but it may be used with zinc oxide, wettable sulfur, "Vigrocide" or "DN-111." If used with rotenone, the manufacturer should be consulted as to its compatibility.

—California Fruit Growers Exchange *Pest Control Circular,* May, 1948

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Copper Hungry Plants?

Five years of research by Battelle Institute, Columbus, Ohio, on copper in plant nutrition show that tobacco, cotton, potatoes and soy beans in some states frequently suffer from copper hunger. Although in a study on tobacco, greenhouse conditions were required to provide a copper deficiency severe enough for tobacco plants to show visual symptoms, yet in 72 out of 89 field tests on farms in tobacco-producing states, substantial dollar returns resulted from treating the land with copper salts. One North Carolina farm copper-treated crop gave 27 percent more tobacco leaf than the check crop; on another farm in the same county a 35 percent increase was noted. In S. Carolina, tobacco production was increased from two to nineteen percent in five test plantings. In Virginia, the maximum increase was 9 percent, but the increase in quality brought a two cent premium per pound. Extensive field tests in Kentucky and Indiana did not show pronounced copper deficiency in the soil, although in many cases crop quality was improved.

•

2,4-D Used on Sweet Corn

Used as a pre-emergence spray in sweet corn, 2,4-D successfully destroyed weeds without injury to the crop. This is the result of one season's trial by Dr. C. L. Hamner, Dr. H. B. Tukey, and R. F. Carlson, horticulturists at Michigan State College. When the 2,4-D was applied at the rate of 10 and 20 pounds per acre, some retardation of growth and injury of corn was noted, but at the rates of 3 to 5 pounds per acre there was no adverse effect on growth, yield or quality of corn.

The 2,4-D induced stronger anchorage and a larger feeding-root system which completely filled the soil around the plant. The firm anchorage given by these roots kept the plants erect during a severe summer storm, whereas plants on untreated plots were blown over.

The horticulturists warn that the success of this method for controlling weeds depends upon many factors such as variety, soil type, temperature, and amount of rainfall. Tests must be made over a period of years and under a variety of conditions before recommendations can be made for general use, but the preliminary results are promising.

Specialists at Michigan State College also warn that general use of 2,4-D sprays on corn cannot be recommended until another season of trials has been completed. Post-emergence sprays must be used with caution. Pre-emergence spraying cannot be recommended at the present time. It is expected that additional work during the coming season will make possible definite recommendations for general use.

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Shade Trees & Fungicides

Of twenty-two organic fungicides tested on shade trees in Illinois, "Puratized Agricultural Spray" 1:5,000 has been most effective in the control of anthracnose of sycamore and leafspot of black walnut. In 1947 approximately three per cent of the leaves on sycamore sprayed with "Puratized Agricultural Spray" were affected with anthracnose. On unsprayed sycamores, approximately sixty per cent of the leaves were affected with anthracnose. In 1946, black walnut sprayed with "Puratized Agricultural Spray" had 1—20 spots per leaflet while the unsprayed trees had 0—200 spots per leaflet.

—J. C. Carter, Illinois Natural History Survey, Urbana, Ill.

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Cotton Insecticides Tried

Cotton investigations were designed especially to test the relative effectiveness of two new organic insecticides, a 20% chlorinated camphene and the 5% DDT-3% (g) benzene hexachloride mixtures as compared with the standard recommended calcium arsenate—1% nicotine mixture. Insects especially investigated were boll weevils, boll worms, and cotton aphids, with some investigation of green bug control.

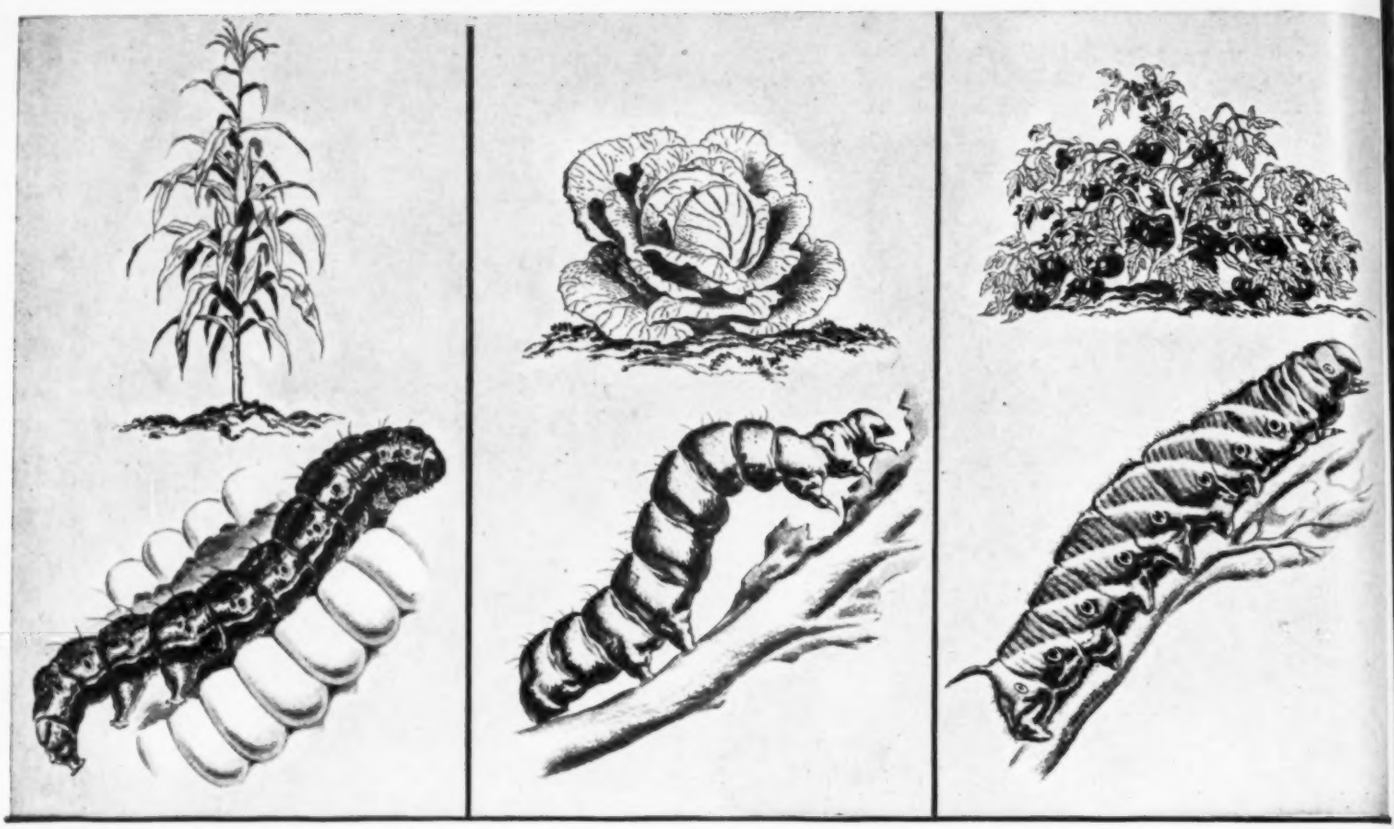
All insecticides used were effective. All gave good control of both aphids and weevils, and the organics both gave good control of stink bugs where they appeared. At the percentage and dosage levels used, there appeared very little difference in degree of control and none of the materials gave indications of damage to the cotton plant.

Neither the chlorinated camphene nor the DDT-BHC mixtures controlled red spider where it appeared, unless they carried at least a 40% sulfur content. Where this was used as the diluent, adequate control of red spider was obtained.

Both of the organic materials appeared to control boll worm excellently with little choice between the two as to efficiency. The calcium-nicotine mixture was not quite as effective against this pest. However, at least one last dusting with the organics especially to control boll worm, is necesssary. If their use is discontinued too early, heavy populations of worms are likely to appear, since both seem to reduce markedly the populations of parasites and predators which ordinarily hold down the numbers of boll worms.

From present data at hand, there would appear to be little choice among the three materials in most years. Cost would undoubtedly be the major factor in selection. Somewhat better control of boll worm and stink bug infestations, however, appear to make the organics a better choice.

—*27th Annual Report,* Georgia Coastal Plain Exp. Station, Tifton.



RHOTHANE KILLS THESE CROP DESTROYERS... IS 8 TIMES SAFER TO USE THAN DDT!

GROWERS want dusts that are effective and *safe.* RHOTHANE (DDD) has proved generally as effective as DDT against most pests of crops and livestock —yet is *8 to 10 times less toxic* to warm-blooded animals!

California reports RHOTHANE (DDD) more effective than DDT against tomato horn worms. New Jersey makes the same report on corn earworms. And in the cattle country, RHOTHANE is proving just as effective as DDT in combatting flies, lice, and ticks. But even more important to you and your customers is the 8- to 10-fold *greater safety* of RHOTHANE which means less residue hazard.

Here are *facts* that make RHOTHANE-formulated dusts more popular and profitable. For bigger sales and more satisfied customers, get the full story of RHOTHANE today.

RHOTHANE *is a trade-mark, Reg. U.S. Pat. Off.*

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MANUFACTURERS
Technical RHOTHANE and other basic chemicals for insecticides and fungicides.

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RHOTHANE WP50 and RHOTHANE 25% Emulsion Concentrate and other unique insecticides and fungicides of proved merit.

Branch Offices: Chicago, Kansas City, Los Angeles, Oakland. *Canadian Distributor:* P. N. Soden & Co., Ltd., Montreal and Toronto. *Represented in Europe by* Chas. Lennig & Co. (G.B.) Ltd., The Adelphia, 1-11 John Adam Street, London W. C. 2, England; *in South America by* Cia. Rohm y Haas, S. R. L., Carlos Pellegrini 331, Buenos Aires, Argentina, and agents in principal South American cities.

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Suppliers' Bulletins

Michigan Chem. Folder

Michigan Chemical Corp., Saint Louis, Michigan, has recently issued "Pestmaster Progress," in which is presented information about insecticides and weed killers. One article answers questions about "What form of 2,4-D shall I use," listing the four most common forms on the market, and explaining the use for which is best suited. The article urges the buyer to read the label which gives information about the concentration.

•

Cotton Pest Booklet

The National Cotton Council of America, Memphis, Tenn., has published a booklet containing the official 1948 State Recommendations for control of cotton pests. Recommended insecticides include benzene hexachloride, chlorinated camphene, calcium arsenate, DDT, nicotine and sulfur. More study is needed on other preparations, the Council states, although some have shown considerable promise. These include chlordane, parathion, "E-3314" and rotenone.

Cotton-growing states are listed separately, with statistics showing the dollar loss from insects in each area, and information on control measures against cotton pests. Annual losses from such insects ranged from $7,000,000 in Oklahoma, to a toal of $54,300,000 in Texas. Hope is expressed that by employing proper insecticides, growers may reduce such losses in 1948.

•

Dow Bulletins Available

Two new bulletins describing "Dowklor" and "Dowfume EB-5" have been issued recently by the Dow Chemical Co., Midland, Mich. The brochure on "Dowfume EB-5" discusses control of insect pests which attack stored grain, and presents photos showing proper methods of application. The booklet on "Dowklor" answers numerous questions regarding formulations, the proper one to use for given problems, and information about how the material is packed.

•

Metal Tube Catalog

"Titeflex all-metal flexible tubing is illustrated and described in a 24-page catalog recently published by Titeflex, Inc., 672 Frelinghuysen Ave., Newark 5, N. J. In addition the catalog describes the company's new bronze tubing for nominal steam pressure applications, monel and stainless steel tubing for higher temperatures and corrosion resistance, and inconel tubing for extremely high temperatures. Included are specifications for standard fittings and illustrations of typical assemblies with these fittings.

•

Harshaw Catalog Issued

Harshaw Chemical Co., Cleveland, Ohio, has recently issued a catalog describing its line of agricultural and industrial chemicals. Listed under the agricultural chemicals department are copper sulfate, copper naphthenate, copper oxychloride sulfate, zinc naphthenate fungicides, and other diversified products used in agriculture. The catalog is available from the firm, 1945 97th St., Cleveland 6, Ohio.

•

Hercules Product Booklet

Hercules Powder Company, Wilmington, has issued a new products book which classifies all of the company's chemicals by family groups. A number of agricultural chemical products are listed for the first time. Among these are "Toxaphene," chlorinated camphene insecticide, and various dairy products. The booklet is available from the company, Wilmington 99, Delaware.

•

Information on Chlordane

Julius Hyman & Co., Denver, have announced the availability of two new bulletins: Technical Supplement #206, on control with chlordane of pests attacking stored products; and Technical Supplement #208A, "Direct Control of Plum Curculio and Other Fruit Insects with Chlordane."

•

New Hanson Pump

Howard Hanson & Co., Beloit, Wis., are marketing a new type pump developed principally for use on a tractor power take-off in spraying weed chemicals and insecticides. The pump features double roll ball bearings, which enables a direct hook-up without use of pulleys or belts, assuring safety, the company states. The product is known as Model "J." Further information is available from the company.

•

New Spray-Duster Outfit

Robinson Fan Corp., Gilroy Calif. has announced the marketing of a new type of spraying rig and duster called "Airospray." The machine is sold in two sizes. It has been demonstrated extensively in the San Joaquin valley and in the Pacific northwest, and throws a spray in a radius of 50 to 60 feet, making it possible to spray 30 to 50 acres a day, depending upon the type of trees or the crop being treated. The rig is powered by a Ford motor which drives a centrifugal type impeller, or turbine. The machine is about five feet shorter than the length of similar outfits. Two tank sizes are available . . . a choice of 600 and 400 gallon tanks.

•

Spray Programs Presented

Washington State College, Pullman, Wash. has issued Extension Bulletin #374 on spray programs for apples and pears in eastern Washington. The bulletin deals with the control of orchard mites, codling moth, aphids and scale, major orchard pests of that area. Information is presented on dormant sprays, pink and calyx sprays, early summer and late summer sprays. Specific information is given on codling moth control with DDT, cryolite or lead arsenate, with a chart giving the residue tolerance of arsenic, lead fluorine, and DDT. A complete spray program is given for numerous insects and plant diseases.

INDUSTRY NEWS

Peterson Joins Stauffer

Dr. P. D. Peterson has joined the staff of the Stauffer Chemical Company, New York, as Technical Director of Agricultural Sales, according to an announcement by the company. Dr. Peterson, who came to Stauffer from the American Fruit Growers, Inc., was to take up his duties June 1.

DR. P. D. PETERSON

Dr. Peterson brings to Stauffer more than two decades of entomological and agricultural experience. He began his intensive study of plant pathology after service in the first World War. After receiving three degrees from the University of Minnesota, he became Assistant Plant Pathologist with the U.S.D.A. Dr. Peterson later rounded out his experience by doing research for the agricultural departments of Kopper Research Corporation and the Freeport Sulphur Company.

Dr. Peterson has also made extensive analyses of weed and pest control problems. In recent years, he has conducted laboratory and field trials on the newer fungicides and insecticides. His work at Stauffer will encompass further research and consultation work.

•

Forms Esler Johnson Co.

Esler Johnson Co., Oakland, Calif., has been formed to act as manufacturers' sales representative on the Pacific Coast. The new company headed by Esler Johnson, formerly coast manager for John Powell & Co., New York, has located its headquarters at 1212 Broadway, Bank of America Building, Oakland. The new firm will specialize in sales of agricultural and industrial chemicals, including insecticides, fungicides, botanical specialties and allied products.

Midwest Names Two

The Midwest Research Institute, Kansas City, has announced the appointment of two new staff members to serve in its Agricultural and Organic Chemistry Department under Dr. C. L. Shrewsbury. The two are Miss Dorothy B. Powers, graduate of Mt. Holyoke College, S. Hadley, Mass., and Harold H. Branine, a graduate of the University of Kansas.

N.F.A. Annual Convention June 21, 22, 23

THE 23rd annual convention of the National Fertilizer Association was scheduled to be held at the Greenbrier Hotel, White Sulphur Springs, W. Va., June 21, 22 and 23. Speakers appearing on the advance program included Maurice H. Lockwood, N.F.A. president, Washington, D. C.; chairman of the NFA board of directors, Weller Noble of Pacific Guano Company, Berkeley, Calif.; Hon. A. L. M. Wiggins, Under-Secretary of the Treasury, Washington, D.C.; Wheeler McMillen, Editor-in-Chief, *Farm Journal*, Philadelphia; Dr. Robert E. Yoder, chief, agronomy department, agricultural experiment station, Wooster, Ohio; and Howard W. Selby, general manager, United Farmers of New England, Charlestown, Mass.

A meeting of the NFA board of directors was scheduled for the opening day, Monday, and the annual open meeting of the Plant Food Research Committee was also on the agenda for that day. The latter session was to be in charge of Dr. H. B. Siems, chairman of the committee. Reports by various sub-committee chairmen were expected to be presented at this meeting. To appear on the program for Monday evening was a motion picture dealing with the role of copper in plant food and animal nutrition. Dr. Geo. K. Davis, nutrition technologist of the Department of Animal Husbandry, Agricultural Experiment Station, Florida University, Gainesville, was to be in charge of the film. The annual N.F.A. banquet was scheduled for Tuesday evening.

Meetings

National Fertilizer Association. Annual Summer Meeting, June 21, 22, 23, White Sulphur Springs, W. Va.

VII International Congress of Agricultural Industries July 12 to 18, Paris, France.

Eighth International Congress of Entomology, August 9-15, Stockholm, Sweden.

Connecticut Agri. Field Day, August 18, Mt. Carmel, Conn.

A.I.F. Association Fall Meeting, September 7, 8, 9, Spring Lake, N. J.

Economic Poisons Control Officials, Second Annual Convention, October 9, Shoreham Hotel, Washington, D. C.

California Fertilizer Association 25th Annual Convention, October 18 & 19, Mission Inn, Riverside, Calif.

North Central Weed Control Conference December 7, 8 and 9, Abraham Lincoln Hotel, Springfield, Illinois.

Amer. Ass'n. Economic Entomologists, New Yorker Hotel, New York, December 13-16, 1948.

•

New Fertilizer Plant

Planters Fertilizer Company has opened a plant in Pine Bluff, Arkansas, for the production of some 200 tons of mixed fertilizer daily for cotton, corn and truck crops of the area. Manager of the establishment is George Dunklin.

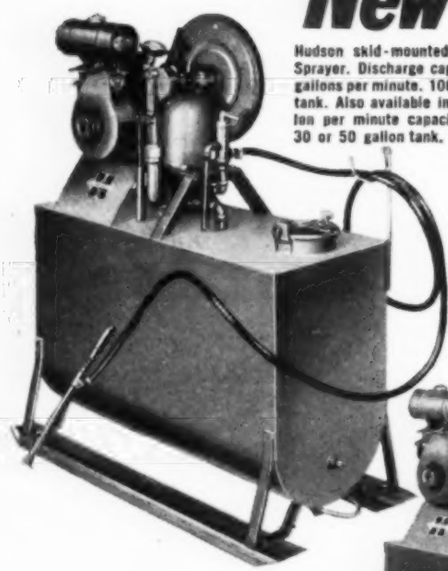
New

Improved

New

Hudson pneumatic tire Power Sprayer with trailer hitch. Discharge capacity 2 or 4 gallons per minute. 150 Gallon tank.

HUDSON POWER SPRAYERS



New

Hudson skid-mounted Power Sprayer. Discharge capacity 4 gallons per minute. 100 gallon tank. Also available in 2 gallon per minute capacity with 30 or 50 gallon tank.

- **NEW Spraying Efficiency**
- **NEW Dependability of Performance**
- **NEW Ease of Handling**

You're looking at the most advanced line of power sprayers ever made. They're completely new . . . with many valuable improvements you want and need . . . and now can have.

These new Hudson Power Sprayers will apply your spray materials more efficiently than was ever before possible. Improved pumps, new agitators, new nozzles and other important features will save time and work, make spraying easier, assure trouble-free continuous operation.

You could make no better investment in labor-saving equipment than to get new Hudson Power Sprayers at the earliest possible date. Hudson is now supplying their dealers. Ask your Hudson dealer about them. Or write us for full information.

New

Hudson pneumatic tire Power Sprayer. Discharge capacity 2 or 4 gallons per minute. Available with 30 or 50 gallon tank.

ONLY HUDSON OFFERS ALL THESE FEATURES

• All-welded steel tanks • Full pneumatic tires on roller bearing steel disc wheels • Rugged, all-welded chassis • Highly efficient gasoline engine • Heavy duty pump • Full controllable pressure • Stainless steel valve assemblage • Slow speed long life pumps • Constant, positive, liquid agitation • Perfect balance assures ease of movement

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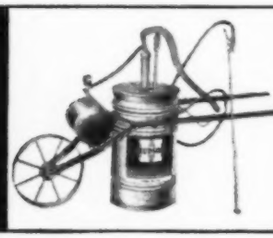


New

Hudson "Porta-Spray." 15 gallon capacity. With or without pressure tank. Steel, semi-pneumatic or full pneumtic wheels.

To Brookhaven Institute

Dr. W. Ralph Singleton has been appointed to the post of senior scientist in the Biology Department of the Brookhaven National Laboratory, Upton, Long Island, N. Y. He was formerly geneticist at the Connecticut Agricultural Experiment Station, New Haven.

•

Plant Food Group Meets

The American Plant Food Council was scheduled to hold its third annual convention at the Greenbrier, White Sulphur Springs, W. Virginia, for four days, beginning June 13. As this issue went to press, plans had been completed for the meeting which was to include talks by Dr. Francis P. Gaines, president of Washington and Lee University, Lexington, Ky.; U. S. Senator Scott W. Lucas, Illinois; Dr. Robert E. Yoder, Ohio Experiment Station, Wooster; Dr. Frank W. Parker, U. S. Dept. of Agriculture; Representative August H. Andresen, Minnesota; and the American Plant Food Council president, Clifton A. Woodrum. A forum of agricultural editors was scheduled to be held under the chairmanship of Dr. Paul D. Sanders, editor of the *Southern Planter,* Richmond, Va. Others named to appear on this panel included Carroll P. Streeter, managing editor of the *Farm Journal;* Philadelphia; Dr. L. R. Neel, editor of the *Southern Agriculturalist,* Nashville, Tenn.; and Paul C. Johnson, editor of the *Prairie Farmer,* Chicago.

A full account of the meeting will appear in the July issue of *Agricultural Chemicals.*

•

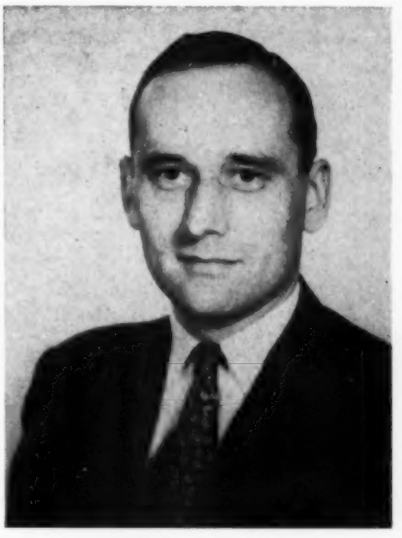
Co-op Builds Mill

Cooperative G. L. F. Exchange, Inc., is building at Bordentown, New Jersey, a new feed mill to serve members in the southeastern part of its territory. Production expectations have not yet been published, but the plant is scheduled to begin operations later in the summer.

•

Flower to AIF Ass'n.

The Agricultural Insecticide and Fungicide Association, New York, has announced the appointment of Stanley A. Flower as director of public relations. Mr. Flower took up his new duties on June 1. He will edit the *AIF News,* the association's publication, and will provide to the press and radio, news releases of developments in the trade. He succeeds Donald T. Stetson who recently resigned.



STANLEY A. FLOWER

Mr. Flower is a graduate of Massachusetts State College, and has had broad experience in both the publication field and in radio. He was formerly connected with the U.S.D.A. Production and Marketing Administration in publicity work, and was for a time on the staff of the army's "Stars and Stripes" in Germany.

•

AEPCO Executives Meet

The executive committee of the Association of Economic Poisons Control Officials met from April 26 to 30 in Washington, D. C., with Drs. W. G. Reed and E. L. Griffin of the Insecticide Division of the U. S. Department of Agriculture. The group discussed cooperation between federal and state enforcement officials, with special emphasis being placed on policy procedure applicable to both federal and state conditions. Subjects discussed included definitions, ingredient statements, directions for use, registration, advertising, labels for large containers, testing, permits for shipment for experimental use, labeling for 2,4-D, poisons containing DDT, parathion, etc., and antidotes and precautionary statements.

State representatives attending the meeting included Dr. J. L. St. John, Pullman, Washington; Dr. H. J. Hoffmann, St. Paul, Minn.; A. B. Heagy, College Park Md.; Allan B. Lemmon, Sacramento, Calif.; Dr. H. J. Fisher, New Haven, Conn.; and Dr. J. F. Fudge, College Station, Texas.

•

In South for Westvaco

Westvaco Chemical Corporation, New York, has announced that James W. Martin, Jr., is now representing the firm in the south, with headquarters in Greenville, Mississippi. He will be available to assist distributors of the company's DDT benzene hexachloride, "3-5-40 Cotton Dust," and fumigating preparations.

•

NFA to Loan Films

Four films, produced in color by the National Fertilizer Association, are available for loan without charge, the NFA has announced. The pictures are as follows: *The Life of the Soil,* in sound, runs for 33 minutes. It pictures how fertility may be maintained in the soil by wise use of both organic matter and commercial plant food. *Putting Plantfood to Work* comes in sound or silent form; 20 minutes or 30 minutes, respectively. It is an antimated film showing how fertilizer moves in the soil to furnish nourishment to the plant. *Green Acres,* silent, runs 30 minutes. This is the southern edition emphasizing pasture improvement and management. *Hunger Signs* is a 15-minute sound film, presenting the story of deficient nutrition in plants and animals. All are 16 mm. films. Further information is available from the NFA Motion Pictures Service, 616 Investment Building, Washington 5, D. C.

•

Chronister to Barrett

Barrett Division of Allied Chemical & Dye Corp. has announced the appointment of Borden S. Chronister, Raleigh, N. C., as agronomist for the southern district. The new appointee is a graduate of the University of Tennessee. He will take over the general agricultural and educational work previously handled by Leroy Donald, recently resigned.

IN CHEMICAL SPRAYING MACHINES THEY ALL INSIST ON QUALITY...

MR. JOBBER...
"My dealers just won't stand for inferior products."

MR. DEALER...
"I have to SATISFY my customers or I'm out of repeat business."

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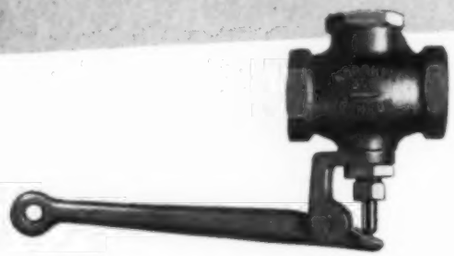
"It's hard-earned cash to me, the equipment I buy has to work right and last long."



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If your chemical spray machines require better...

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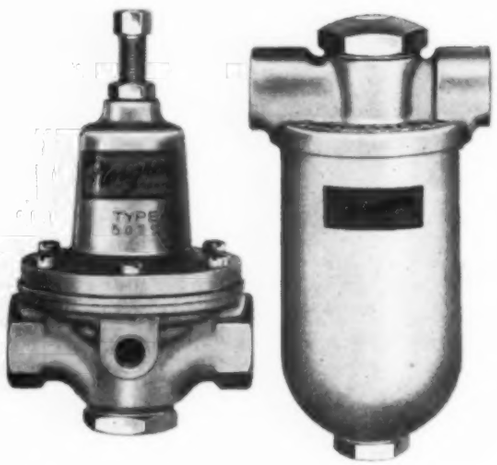

Norgren

Pittsburgh Advances Two

Pittsburgh Coke & Chemical Co., Pittsburgh, has announced the advancements of Dr. William B. Brown and Dr. William J. Zabor to the positions of manager of chemical production and director of chemical development, respectively. Dr. Brown, former director of research, has been with the company since 1942. He is a graduate of New York University, and also of the University of Munich. Dr. Zabor, former director of research for the company's activated carbon division, is a graduate of Brown University and the University of Rochester. He has been with Pittsburgh since 1945.

•

Conn. Field Day in August

Connecticut Agricultural Experiment Station has announced that its annual Field Day will be held on August 18 this year, according to Dr. James G. Horsfall, director. In past years, nearly 1,000 persons have visited the field day event which is held at the Station's experimental farm in Mt. Carmel. Exhibits and demonstrations of the current work at the station will be featured. The committee in charge includes J. Peter Johnson, entomologist, chairman; Dr. H. B. Vickery, biochemist; T. R. Swanback, agronomist; W. T. Mathis, analytical chemist; H. G. M. Jacobson, agronomist; E. M. Stoddard, plant pathologist; H. W. Hicock, forester; W. H. Gabelman, geneticist, and Miss Amanda Quackenbush, editor.

•

New Association Secretary

Earl D. Anderson has joined the staff of Frank J. Zink Associates and has been appointed Secretary of the National Sprayer and Duster Association, Chicago. Before accepting his new position, Mr. Anderson was connected with Republic Steel Corporation as Agricultural Engineer and Manager of the Agricultural Extension Bureau since 1936.

Mr. Anderson is a native of Iowa, and a graduate of Iowa State College, Ames. He fills the post made vacant by the resignation of Mr. John Benham. Headquarters of the Association are on the 43rd floor of the Board of Trade Building, Chicago.

100 Bu. Per Acre Corn Yields via Fertilizer

That modern fertilization can add tremendously to the yield of given farm land was accented in Virginia when Governor William Tuck awarded certificates at Hopewell, Va., to the first charter members of the state's "100 Bushel Per Acre Corn Club." The achievement was made on Prince George County land which formerly had grown an average of only 17 bushels per acre. The above photo was taken in connection with the awards. Left to right: Andrew Moncol and his father, Edward Moncol; Governor Tuck; and Joseph Chudoba and his son, Joseph, Jr. — (Photo by Nat'l Fertilizer Ass'n.)

Brannan New Ag. Secretary

Charles F. Brannan was named by President Truman on May 24, as the new Secretary of Agriculture, to succeed Clinton P. Anderson who two months ago announced his candidacy for the U. S. Senate. The new secretary is well known to many persons in the agricultural chemical industry. He appeared on the program of the A.I.F. Association meeting in Washington in February to represent the Department in the absence of Mr. Anderson who was orginally scheduled to speak. At that time Mr. Brannan commended the pesticide industry for its contributions in the insecticide, fungicide and herbicide fields which have made "tremendously impressive" progress within the past few years.

Secretary Brannan is a native of Denver, Colorado, and a graduate of Denver Law School with the class of 1929. Up to 1935 he had specialized in irrigation and mining law, but in that year he became assistant regional attorney for the office of the solicitor of the Department of Agriculture. In November, 1941, he was appointed regional director of the Farm Security Administration for Colorado, Wyoming and Montana, and in April, 1944, became assistant administrator of FSA.

Since then he has continued to advance in the department, and was assistant Secretary of Agriculture at the time of his new appointment.

In a press conference following his nomination by the President, Mr. Brannan stated that he plans to keep intact the policies of former Secretary Anderson. "I think it is best to keep his program going," he said.

Registration Deadline
June 25, 1948

for all insecticides and fungicides included in regulations for the Federal Insecticide, Fungicide and Rodenticide Act of 1947.

Manufacturers of such economic poisons who have not yet registered with the U. S. Department of Agriculture, must do so before June 25.

Applications for registration should be addressed to Insecticide Division, Livestock Branch, Production and Marketing Administration, U. S. Dept. of Agriculture, Washington, 25, D. C. No fees are charged for registration.

Rodenticide and herbicide products were to have been registered with the U.S.D.A. before Dec. 25, 1947, but registration for insecticides and fungicides, comprising a much larger volume, was set ahead six months.

FERTILIZER REPORT

(*Continued from Page 29*)

percent but that of potash decreased 17 percent. In the East North Central region fertilizer sales increased to 26 percent but that of potash increased only 7 percent. On the other hand, in the West North Central Region the contained potash increased 39 percent while that of fertilizer sales was 21 percent. Commercial mixtures supplied 95 percent of the total potash content of all fertilizers.★★

TABLE 5

Consumption of Plant Food, by States and Regions, Year Ended June 30, 1947[1]

Unit - Short Tons

State & Region	In Mixed Fertilizers				In All Fertilizers			
	Nitrogen	Phosphoric Acid		Potash	Nitrogen	Phosphoric Acid		Potash
		Available	Total			Available	Total	
						[3]		
Maine	13,091	21,651	23,541	27,696	13,375	26,640	28,699	27,755
New Hampshire	805	1,611	1,669	1,442	951	2,917	3,039	1,614
Vermont	1,059	2,605	2,719	2,335	1,137	7,750	8,061	2,383
Massachusetts	3,595	5,784	6,172	5,242	4,384	8,126	8,611	5,676
Rhode Island	716	1,350	1,443	1,198	790	1,879	2,023	1,263
Connecticut	3,096	4,620	4,879	4,228	4,181	7,275	7,588	5,322
New England	22,362	37,621	40,423	42,141	24,818	54,587	58,021	44,013
New York	18,069	43,223	45,444	26,944	21,089	77,995	81,287	27,177
New Jersey	10,010	24,507	25,701	20,557	11,435	27,156	28,420	21,192
Pennsylvania	16,409	55,581	57,838	33,239	17,309	72,057	74,812	33,412
Delaware	1,691	6,035	6,218	3,980	1,818	6,486	6,757	3,994
District of Columbia	81	179	188	87	110	220	229	95
Maryland	8,095	26,638	27,752	16,731	9,197	30,300	31,539	16,800
West Virginia	1,908	6,697	7,126	3,494	2,237	14,385	15,875	3,498
Middle Atlantic	56,266	162,860	170,266	105,032	63,175	228,599	238,919	106,168
Virginia	17,695	55,348	57,645	32,202	22,875	84,174	86,861	32,340
North Carolina	58,008	150,783	156,151	97,171	78,273	165,971	173,687	99,771
South Carolina	29,023	71,504	74,975	44,681	46,442	79,627	83,312	48,119
Georgia	41,375	95,988	101,143	65,247	55,600	119,036	124,782	66,676
Florida	34,439	58,498	75,091	51,923	38,415	63,349	81,783	54,852
South Atlantic	180,537	432,121	467,005	291,224	241,605	512,157	550,425	301,958
Ohio	17,269	91,499	102,976	54,293	19,560	98,893	112,234	54,469
Indiana	11,864	72,853	77,223	52,041	14,640	81,269	96,011	53,048
Illinois	6,488	31,789	34,705	24,061	10,646	62,593	237,006	29,134
Michigan	7,457	41,274	43,158	27,261	10,089	52,161	55,132	27,556
Wisconsin	7,104	38,882	40,231	28,779	10,423	47,331	51,491	29,418
E. No. Central	50,182	276,297	298,293	186,435	65,358	342,247	551,874	193,624
Minnesota	2,737	14,081	14,674	10,364	4,709	25,435	27,607	10,580
Iowa	3,839	19,416	20,594	10,272	7,202	32,592	38,968	10,816
Missouri	5,713	25,314	27,420	12,187	8,177	39,426	43,995	12,436
North Dakota	369	1,795	1,906	1,043	382	2,848	3,182	1,043
South Dakota	155	524	548	157	156	787	1,038	157
Nebraska	104	274	282	40	2,134	2,264	2,397	40
Kansas	938	4,107	4,294	1,127	2,393	14,046	15,282	1,134
W. No. Central	13,855	65,511	69,718	35,190	25,153	117,398	132,469	36,206
Kentucky	9,547	30,134	31,775	17,133	13,097	47,200	54,443	17,331
Tennessee	8,704	29,208	30,467	15,954	16,168	55,054	56,945	16,509
Alabama	29,231	57,097	60,141	39,874	44,186	95,020	100,263	40,684
Mississippi	14,378	25,381	26,736	14,997	56,266	42,428	44,795	17,825
Arkansas	5,524	12,966	13,672	9,072	19,000	22,688	23,803	11,131
Louisiana	6,621	16,260	16,926	6,877	22,210	25,400	26,528	7,361
Oklahoma	911	2,593	2,702	959	1,447	5,803	11,550	964
Texas	10,073	25,711	26,767	10,073	21,282	51,099	54,961	10,160
South Central	84,989	199,350	209,086	114,939	193,658	344,692	372,988	121,965
Montana	175	455	457	20	595	3,778	3,834	28
Idaho	723	1,195	1,212	147	2,658	9,473	9,691	748
Wyoming	34	61	62	2	157	1,442	1,464	2
Colorado	474	1,223	1,251	313	1,796	5,959	6,061	375
New Mexico	171	312	316	47	1,032	3,499	3,574	47
Arizona	1,091	1,852	1,855	27	7,065	5,454	5,640	460
Utah	270	812	818	59	1,629	3,604	3,665	74
Nevada	21	34	35	10	40	162	173	11
Washington	2,786	4,550	4,721	2,872	8,142	12,412	13,005	3,231
Oregon	1,895	3,747	4,001	2,249	9,671	8,711	9,286	2,895
California	25,671	25,717	27,108	11,749	98,326	62,723	65,067	14,786
Western	33,311	39,958	41,836	17,195	131,110	117,217	121,460	22,657
Hawaii	4,191	2,547	2,742	5,854	13,088	4,549	4,760	10,590
Puerto Rico	22,210	14,223	14,988	21,270	25,623	14,449	15,223	21,293
Territories[2]	26,401	16,770	17,730	27,124	38,711	18,998	19,983	31,883
Continental U. S.	441,502	1,213,718	1,296,627	792,156	744,877	1,716,897	2,026,146	826,591
Total	467,903	1,230,488	1,314,357	819,280	783,588	1,735,895	2,046,129	858,474

1/ Includes Government distribution.
2/ Exclusive of Alaska, total plant food approximately 117 tons.
3/ Includes 3% of the phosphate rock as available P_2O_5.

CFA Meeting Dates Set

October 18-19 is the time set by the California Fertilizer Association for its 25th annual convention to be held at the Mission Inn, Riverside, Calif. Members of the program and entertainment committees have been announced by Wallace Macfarlane, CFA president, as follows: Entertainment committee; T. G. Lathe, Wilson & George Myer & Co., chairman; Sidney Herzberg, Ontario Fertilizer Works, Ontario, Calif.; Wm. Snyder, Wilbur-Ellis Co., San Diego; and Charles Carlson, Balfour, Guthrie & Co., Los Angeles.

The program committee consists of Walter Houser, Southern California Fertilizer Co., Los Angeles, Calif., chairman; S. B. Tatem, Swift & Co., Plant Food Division, Hayward, Calif.; and Dr. Oliver E. Overseth, CFA executive secretary.

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DDT Becoming Scarce?

The DDT supply situation was undergoing an apparent change as this issue went to press. Due to a number of factors, the commodity had shifted somewhat to the less plentiful side, with the price holding firm, but the possibility of an increase mentioned.

Industry spokesmen close to the market said that the shortage was brought about by factors which included the heavy withdrawal of both technical DDT and formulations during the past three months; and a reduction in DDT output during the past eight or ten months.

Early in June, some manufacturers were reported unable to make spot shipments of DDT because of heavier commitments.

Second Edition, "Our Land"

The American Plant Food Council, Washington, D. C., has issued its second printing of "Our Land and its Care" to satisfy the demand. The first edition of 400,000 copies has been practically exhausted, the Council states. The book is the story of the soil and how its fertility may be maintained. The new edition is printed on enamel paper, and the cover is in two colors. Individual copies are available from the American Plant Food Council, Inc., 817 Barr Building, 910 17th St., N. W., Washington 6, D. C.

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"Producers of FRIANITE" ★ **FRIANT · CALIFORNIA**

Blight Service in Conn.

Connecticut Agricultural Experiment Station, New Haven, has announced the continuance of its tomato blight warning service in 1948, if the disease threatens the crop. The service will be carried out in cooperation with the U. S. Department of Agriculture and key experiment station plant pathologists in the eastern seaboard states.

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Opens Service Office

Gilbert B. Kahn has established his own organization for buying, selling, appraising, liquidating machinery, equipment and complete plants in the chemical field, he has announced. His offices are located at 75 West Street, New York 6, N. Y. Mr. Kahn was for many years connected with the Consolidated Products Co., New York.

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A & S Presents "Sta-Stak"

Arkell & Smiths, Canajoharie, N. Y., manufacturers of multiwall fertilizer bags, have introduced their new product, "Sta-Stak" bag, to the industry. The announcement is made in connection with the opening of the new Arkell and Smiths multiwall bag-plant at Mobile, Alabama. The new bag is claimed to be more tough, and will remain stacked when piled in warehouses or in railway cars. Manufacture of the "Sta-Stak" bag is done at both the Wellsburg, W. Va., and Mobile, Ala. plants of the company.

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Ag. Congress for Paris

The VII th International Congress of Agricultural Industries is scheduled to be held in Paris, France, July 12-18. The congress will be divided into three divisions, with each division subdivided. The three main divisions are: General scientific and industrial studies; Industries; and Economic studies. Two sections are scheduled to deal with fertilizers and products for pest control.

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Quarantine Expanded

New areas in the south are being regulated because of the presence of white-fringed beetle, according to a recent announcement by Under Secretary of Agriculture, N. E. Dodd. The area is extended to include two counties in South Carolina, as well as several additional counties in the previously quarantined states of Alabama, Florida, Georgia, and Mississippi. Safeguards are prescribed to cover the movement from regulated areas of commodities likely to spread the insect pest to hitherto uninfested territory. Crops attacked by the white-fringed beetle include peanuts, corn and cotton. The larvae are destructive to white potatoes and other crops.

•

Opens Chicago Office

Chemical Corporation of Colorado, Denver, has opened a sales office at 201 N. Wells St., Chicago. The new office will be in charge of Hyman Gold, divisional sales manager, assisted by John Clifford. In addition, the company has appointed

how to kill an appetite...

Benzene hexachloride is the answer. It's death to many a crop-greedy insect. In scores of cases, no other insecticide can match its effectiveness.

CSC is producing technical-grade benzene hexachloride of a dry, flake type, ideal for grinding. The minimum gamma content, obtained by infra-red spectroscopy, is labeled on every drum. All of Commercial Solvents' production is going to manufacturers who grind and formulate insecticides.

Another important agricultural chemical made by CSC is anhydrous ammonia, produced at the Dixie Plant at Sterlington, La. The major part of CSC's output is being converted into nitrogen-rich fertilizers by Gulf Coast manufacturers.

CSC is working around the clock to make essential agricultural chemicals for use on American farms.

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AGRICULTURAL DIVISION, COMMERCIAL SOLVENTS CORPORATION, 17 EAST 42nd STREET, NEW YORK 17, N. Y.

Russell Ryland as divisional sales manager for Oklahoma and Kansas.

Effective June 10, the Denver plant, processing agricultural chemicals, was to be under the active management of Dr. Dana Sherrill, plant superintendent. Dr. Sherrill was formely engineer for Heckerthorn Corp. and more recently professor of Chemical Engineering at Denver University.

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Control of Leaf Roller

Scientists at the Geneva New York, Experiment Station are now in the midst of a series of tests of different spray materials which are being used to control the Red-Banded leaf roller, apple pest. The materials are receiving a thorough testing both on the Station grounds and on an Orleans County orchard which suffered one of the heaviest infestations of this pest last year.

According to Professor F. Z. Hartzell and Dr. P. J. Chapman, who are working together on the problem, emphasis is on the use of lead arsenate, which proved effective in previous tests. DDT is also being checked, although it has given poor control in the past. Parathion is also being tried, and it appears that there might also be a place for the use of oils in killing eggs of the insect. In the latter connection, laboratory experiments show that the so-called "superior" oil killed egg masses of the leaf roller at rather low strengths. Since a tree with 300 egg masses may produce about 15,000 larvae, it would obviously be advantageous to destroy the pest if possible in the egg stage. The use of oil in this way is being further tested in the field.

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Locust Control in S.A.

Eleven helicopters are in regular use for locust control work in Argentina, according to C. J. Tippett, technical director of Trabajos Aereos Y Representaciones which is engaged in such work in South America. He states that 20 percent benzene hexachloride is used to get excellent results. Kills have been recorded as high as 98 percent within six hours after application.

A novel technique in "cloud dusting" is also reported by Dr. Tippett. He says that helicopters are flown into locust swarms in midair, and good results are obtained by opening the dust hoppers inside the swarm. The insecticide used for this operation is dinitro-ortho-cresol, he reports. Although accurate results by this method are difficult to determine, it is considered to be effective. The locusts keep on flying, but die in from six to sixteen hours after contact with the poison. They sometimes continue for "great distances" after a "cloud dusting," finally disappearing in the jungle to die. Many millions of locusts are in a swarm which often measures as much as 50 miles long, 25 miles wide, and 800 feet thick. The company is presently combatting the Fall locust swarms in the northern provinces of Salta, Jujuy and Entre Rios, South America.

New Fertilizer Book

Arguments both pro and con in the matter of fertilizer use are presented at length in "Chemicals, Humus and the Soil," a 358 page book by Donald P. Hopkins, just off the press. Published by Chemical Publishing Co., Inc., Brooklyn, N. Y., the volume is a presentation of the latest information and opinion about fertilizers, manures and soil fertility.

It endeavors to prove the necessity of chemical fertilizers for maintaining the fertility of the soil. It also includes concise information on which soil conditions and which chemical fertilizers are most suited for special crops and vegetables. Space is devoted to cereal crops, to roots and tubers, and to various vegetables.

The book clarifies the relationship of manures, compost and chemicals as fertilizers and points out how chemicals should be used to obtain the best results in farming and gardening. It gives an excellent treatment of the relative merits of manures and chemical fertilizers. The author uses a sound logical approach to avert the confusion which has resulted from advocates of compost and manure to discredit the use of chemical fertilizers.

Two grand divisions feature the contents of the book. These are "The case for fertilizers" and "The case against fertilizers." The first section discusses the chemical trio, NPK, the nitrogen spiral; the humus monopoly; lime and fertility; and a chapter entitled "Considerable Trifles."

The "Against" part of the book presents all of the arguments used to discourage use of modern chemical fertilizer materials. It discusses the subject under the chapter names of "Humus and Health;" "Plant Disease;" "Food Values and the Chemicals;" "Other Opinions;" "In Perspective" and "Looking Ahead."

The book is priced at $8.50, and is available from Chemical Publishing Co., Inc., Brooklyn, N. Y.

Potash to Aid Tobacco

Writing on the functions of potash in tobacco growing, Swanback and Anderson say; "Potassium is an essential element in the growth of all plants, its metabolic function being primarily that of an activating agent in the synthesis of carbohydrates and proteins. It also acts as a carrier in the absorption and translocation of other ions. There is some evidence that it makes the plants more resistant to disease. In tobacco it has three specific functions: (1) It makes the plants more resistant to drought, (2) in the cured tobacco leaves the potash salts absorb moisture and make the leaves pliable so that they can be handled during a 'damp,' (3) potassium is the most important element in promoting the burning capacity of the leaves. Without potash, tobacco leaves have no fire-holding capacity at all; they would burn with a flame, like paper, but without continuous incandescent combustion." (*Conn. Bul.* 503)

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G. E. Missbach, Atlanta 3 • Natural Products Corps., Montreal

Announces New Officers

The Longview-Saginaw Lime Works, Inc., Birmingham, Ala. has recently announced the names of its new officers. They are: Warren Lewis, president; Malone Moore, vice-president and treasurer; Irwin Ehlmann, secretary; E. M. Snow, plant manager; and Mrs. George A. Brewer, chairman. The company deals in lime for agriculture and for chemical and structual purposes.

•

"Super Killex" by S-W Co.

Sherwin-Williams Co., Cleveland, has announced the development of a new insecticide, "Super Killex," for control of the so-called 17-year locust. (*periodical cicada*) The principal active ingredient is tetraethyl pyrophosphate, and the recommended dosage is set at three ounces per 100 gallons of water. Use of stronger dosages may injure plants, the S-W bulletin states.

Experiments in Ohio have indicated the efficacy of the product in controlling locusts on 75 acres of young peach trees. These tests were made under the direction of V. E. Keirns of the Sherwin-Williams agricultural chemicals division field technical service. Use of tetraethyl pyrophosphate for locust control has been recommended by the Ohio Extension service. The material, being highly toxic, is recommended for handling only by persons accustomed to spraying with similar toxicants, the company states.

•

New St. Regis Product

The packaging division of St. Regis Paper Co. has announced its entry into the citrus field with a specially designed multiwall paper bag and mechanical packer. The new product, called the "Citrobag," is chemically-treated for the shipment of citrus fruit. It is constructed of four plies of kraft paper, and has a capacity of approximately 45 pounds which is half that of the traditional wooden box. Introduction of the new bag is expected to modernize the packaging operation in the citrus industry, and speed the output.

N. Central Weed Report

Proceedings of the Fourth Annual Meeting of the North Central Weed Control Conference and report of the research committee have been published. This is the complete report of the meeting which was held last December at Topeka, Kansas. The 300-page report contains abstracts of all the papers presented at the conference; a review of the program is given, as is a complete list of registrants at the meeting. The new officers of the conference are named. Dr. C. J. Willard, Ohio State University, Columbus, is president; W. W. Worzella, South Dakota State College, vice president; and Noel S. Hanson, University of Nebraska, Lincoln, secretary-treasurer.

Copies of the proceedings are available at $2. Order from T. F. Yost, State Weed Supervisor, State House, Topeka, Kansas.

and that's only part of the story

Here's the rest—

- Concern over hazards arising from toxic insecticide residues remaining on edible truck and garden crops at time of harvest is paramount with growers and canners.
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Big Spraying Job in Kansas

A "double barreled" program of fly control is reported to be under way in Kiowa County, Kansas, according to Ray L. Cuff, regional manager of the National Livestock Loss Prevention Board, Kansas City. The 1948 campaign is said to be on a much larger scale than previous attempts of control. Four agencies are cooperating: the U. S. Department of Agriculture, the Kansas State Livestock Sanitary Commissioner, Extension Divisions of state colleges of Kansas and Missouri, and the National Livestock Loss Prevention Board.

The program includes the treating of every head of cattle in the county (about 35,000 head), as well as every barn, shed, grain bin, every outbuilding and fly-breeding spot in all villages and towns and on every farm and ranch in the county. The cattle sprays are with a 0.5 percent DDT suspension, and DDT is also being used in many of the other applications, he says.

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Corn Borer in 28 States

Distribution of the European corn borer now extends from northern Maine through New England, and westward through the Great Lakes States and across the Missouri River, according to George L. Davis, Office for Food and Feed Conservation, Bureau of Agricultural Economics, U.S.D.A. He reported recently that the pest is now known to occur in 28 states, following its westward movement in 1947. The infestation extends southward into northern Tennessee and part of North Carolina.

Corn borer damage last year was estimated at almost $97,000,000. The estimate is based upon a recently completed survey by the Bureau of Entomology and Plant Quarantine and cooperating State agencies. In 1946, the damage was estimated at $37,000,000. In 1940, it was only about $6,500,000.

In the States that suffered the most damage from the corn borer last year, the estimated losses were: Illinois, $31,700,000; Iowa, $29,300,000; Minnesota, $13,900,000; Indiana, $7,400,000; Ohio, $3,100,000; Pennsylvania, $2,600,000; Maryland, $2,100,000; and Wisconsin, $2,100,000.

A cooperative program between the U. S. Department of Agriculture and four Midwestern States to increase the production of field corn by control of the European corn borer is now under way. Plans for the program were completed recently at a meeting with agricultural officials from Illinois, Iowa, Wisconsin, and Minnesota, the four participating States.

Nematode Fight Continues

The U.S.D.A. Bureau of Entomology and Plant Quarantine expects to continue its control measures against the golden nematode on Long Island this year, it was pointed out at a meeting of the House Agriculture Committee in Washington on May 31. S. A. Rohwer, assistant chief of the bureau told the committee that the campaign may last ten years, and might cost an estimated $492,500 the first year.

What's Your Problem?

Aphid Spray
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Nicotine Base for Dust
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Controlling Poultry Roundworm
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Delousing Poultry
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4. BLACK LEAF 155 WITH DDT—for spraying apples and pears for the control of codling moth, leafhoppers, and similar pests.

5. BLACK LEAF 10 DUST BASE—meets the demand for a nicotine compound easily mixed with non-alkaline carriers to make a neutral dust.

6. BLACK LEAF CUNIC DRENCH—for sheep and goats. Formula recommended by U. S. Department of Agriculture.

7. BLACK LEAF POWDER AND PELLETS—for controlling the large roundworm (Ascaridia galli) in chickens.

8. MASH-NIC—for mixing with poultry feed to control large roundworm.

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Mul-si-mo is a thin amber-colored oily liquid about the same viscosity as Kerosene Oil.

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A practically 100% Oil Product—No Water—No Soap—No Potash nor other Alkalines.

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Extensive tests have shown *Mul-si-mo* to be non-toxic to plants when used at a dilution of 1 to 100. (Plants used in tests—Coleus.) As summer oils are usually used at the dilution of half-gal. to 100 gals. water, at such dilution the rate of *Mul-si-mo* to water would be 1 to 20,000.

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Per Gallon $4.00; 5 Gallons and up @ $3.75 per Gallon; 30 Gallon Drums @ $3.50 per Gallon, f.o.b. New York or Jersey City. (Above prices for U. S. only. Foreign prices on request.)

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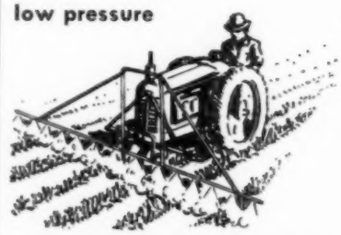

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New NFA Publication

The National Fertilizer Association has published its first issue of *Pasture Progress,* a quarterly issue to succeed the previous mimeographed bulletin, "Pasture Notes" which the Association has distributed in the past. The new publication presents a survey of new forage crops of commercial importance recently developed by State and Federal experiment stations. According to the publication, basic material for the article was furnished by Dr. Fred V. Grau, Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville, Md.; R. P. Cocke, Assistant Agronomist, Virginia Agricultural Experiment Station, Williamsburg, Va.; Dr. Glenn W. Burton, Geneticist, U.S.D.A., Tifton, Ga.; Mason A. Hein, Senior Agronomist, Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville; Dr. E. A. Hollowell, Senior Agronomist, Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville; Roland McKee, Senior Agronomist, Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville; Paul Tabor, Agronomist, Soil Conservation Service, U.S.D.A., Spartanburg, South Carolina; Dr. H. M. Tysdal, Principal Agronomist, Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville; H. A. Schoth, Agronomist, U.S.D.A., Corvallis, Oregon; and W. A. Wheeler, Director of Agricultural Research, Field Seed Institute, and Collaborator, U.S.D.A., Production and Marketing Administration, Washington, D. C.

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Ralph E. Dorland Dies

Ralph E. Dorland, 68, for the past 30 years eastern general sales manager in New York for Dow Chemical Co., died suddenly of a stroke May 14.

Since 1946 Mr. Dorland had been president of the Synthetic Organic Chemical Manufacturers Association. He was one of the founders and twice president of the Chemical Salesmen's Association of the American Chemical Industry. He had served as president of the New York Board of Trade and chairman of the Drug, Chemicals and Allied Trade section of the organization.

"Doc," as he was familarly known in the chemical and drug industries, was born in Elyria, O. He was graduated from Purdue University in 1901. A pharmacist, Mr. Dorland at one time operated his own drug store. He also taught in Green's School of Pharmacy in Indianapolis.

Surviving are his wife, the former Julia Reuter, and four sons; Grant A. Dorland of Lexington, Ky.; Wayne E. Dorland, president of Industry Publications, Inc., New York; Jack A. Dorland, associated with Dow Chemical Co. in New York and Ralph E. Dorland, Jr. of San Francisco.

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Pacif. Slope AAEE Meets

Numerous papers on insecticides, and various symposia on late developments in the field were scheduled for the 32nd annual meeting of the Pacific Slope Branch of the

American Association of Economic Entomologists, at Vancouver, B.C., June 14, 15, and 16. Speakers named on the advance program included S. A. Rohwer, assistant chief, bureau of Entomology and Plant Quarantine, U.S.D.A.; Prof. G. J. Spencer, Univ. of British Columbia, Vancouver; and the three Pacific Slope Branch officers: W. J. O'Neill, Wenatchee, Wash.; J. N. Roney, Phoenix, Ariz.; and Roy E. Campbell, Alhambra, Calif.

A full report of the meeting is to be written by Dr. Alvin J. Cox for the *Agricultural Chemicals* July issue.

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N.A.I.D.M. at Spring Lake

The National Association of Insecticide and Disinfectant Manufacturers, Inc. was to hold its annual convention at the Monmouth Hotel, Spring Lake, N. J. June 14, 15 & 16. Association president Gordon M. Baird, Baird & McGuire, Inc., Holbrook, Mass., was to open the meeting with an address of welcome. Tuesday's program was to include a discussion of the operation of the new Federal Insecticide Act, by Dr. W. G. Reed, chief of the insecticide division of the Production and Marketing Administration, U.S.D.A.; and a report on the work of the chemical-biological coordination center of the national research council was to be made by Dr. Roger B. Friend, Connecticut State Entomologist.

The advance program also called for a showing of the color and sound film, "Better Livestock," through courtesy of Ray L. Cuff, regional manager of the National Livestock Loss Prevention Board, Kansas City, Mo. Also on the program was a report of the rat control program, by Harold Noble, S. B. Penick & Co., New York. A symposium on the insecticide business in general was scheduled to be held, with Ira P. MacNair as moderator.

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Knipling Awarded Medal

"For exceptionally meritorious conduct in the performing of outstanding services to the United States," Dr. Edward F. Knipling, as Director of the Orlando station of the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture during the war period, was awarded the Medal of Merit May 20, 1948, by the Department of National Defense. The citation, signed by the President, which accompanied the award, stated that Dr. Knipling "planned and directed investigations for the development of insecticides and repellents for the prevention of insect-borne diseases in the United States Army. As a result of these studies the Armed Forces adopted the use of DDT for the control of insect-borne diseases and new uses and equipment were developed for the dispersing of insecticides by new methods, including the airplane spraying of infested areas. All these research contributions were of inestimable value to the health and morale of United States troops, as well as to the Nation as a whole."

The Medal of Merit, awarded only to civilians, and the Legion of Merit, awarded to military personnel,

were authorized by Public Law, 671, 77th Congress, approved July 20, 1942, for the purpose of rewarding outstanding and meritorious conduct in the performance of duties in furtherance of the war efforts of the United Nations. The award stems from the Badge for Military Merit, America's oldest decoration, established by George Washington in 1782.

Dr. Knipling was notified early this year that he was also to be awarded Great Britain's highest decoration to civilians, the King's Medal for Service, for the part he carried on in relation to the same investigations.

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P.I.I. Meets in Calif.

The Pacific Insecticide Institute was scheduled to hold its annual summer meeting in Los Angeles, Calif., June 5, in connection with the meeting of the Association of Economic Poisons Control Officials. The day's activities were to include a luncheon at Hotel Clark, with members of the AEPCO as guests. In an advance letter to P.I.I. members, W. D. Gray, secretary, stated that Dr. W. G. Reed, chief of the insecticide division, U.S.D.A. was expected to be present at the meeting. The legislative committee of the P.I.I. was to meet with Allan B. Lemmon, president of A.E.P.C.O., to consider the present draft of the Uniform State Economic Poisons Law.

The open meeting of the P.I.I. was to be under the chairmanship of Dr. G. F. MacLeod. No formal talks were scheduled, but discussions and questions-and-answers were to be held regarding further cooperation between federal and state control officials.

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Verrault to Geigy Co.

Geigy Company, Inc., New York, has announced that Howard N. Verrault has joined its sales staff. He will specialize in the sale of DDT insecticides and other economic poisons for agriculture. Mr. Verrault is well known in the Insecticide industry, having been with Velsicol Corp., formerly, and more recently with R. J. Prentiss & Co., as director of sales in the southwest.

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Spencer Buys Surplus Plant

Spencer Chemical Co., Kansas City, has purchased from the War Assets Administration the war surplus Jayhawk Ordnance Works, an ammonia plant at Galena, Kansas. The price was reported to be 11 million dollars. During the war the plant was operated by Military Chemical Work, Inc., a Spencer subsidiary, and was leased from WAA in April, 1946. Production consists chiefly of fertilizer grade ammonium nitrate.

The new owners indicate that production of fertilizer grade ammonium nitrate may be boosted to 8,900 tons a month with the addition of the Galena plant. Graining facilities will not be installed at the new plant, however, but the company will continue to use those at its Parsons, Kas. unit.

BOOK REVIEW

(*Continued from Page 41*)

The figures given in the yearbook are for the most part the official figures supplied by the governments of the nations included in the U. N. Tables include data on agricultural production, both in crops and livestock, in all countries. The book may be obtained in the U. S. at International Document Service, Columbia University Press, 2960 Broadway, New York 27, N. Y. In Canada, it may be ordered from Ryerson Press, 299 Queen St., W., Toronto; and in the United Kingdom, at His Majesty's Stationery Office, 429 Oxford St., London, W. I. Price is $2.50.

GUEST EDITORIAL

(*Continued from Page 23*)

being built which, when completed, may take care of the requirements of the western states.

The only element in adequate supply during the past year has been potash which was procured in most of the western states from the Amerian Potash and Chemical Company at Trona. New Mexico deposits will furnish what little is needed in Colorado and New Mexico.

Due to the drouth conditions of the past year, power available for manufacture of nitrogen in California has been materially reduced. This condition is cutting the supply of nitrogen for this season by about one-fifth; but it is hoped that there will soon be sufficient power to run these nitrogen plants to capacity.

The price of nitrogen fertilizers has risen somewhat during the past two years and this factor, along with the higher freight rates, has increased the price of mixed fertilizers considerably. In relation to purchases made by farmers of other commodities, fertilizer prices have probably risen less than any material the farmer buys. Outside of the market for citrus, peaches, prunes, apricots and apples in California, most of the farmers have enjoyed a better income during the past year than ever before. The loss due to the low prices in fruit crops has been balanced by higher prices of field and truck crops. Alfalfa, rice, flax, potatoes, beans, sugar beets and cotton have all been marketed at higher price levels. Last year California was the fourth state in the dollar production of cotton. The crop had a gross dollar value of 146 million for the lint and seed. This is the first time in the history of California that the cotton crop has surpassed that of oranges. The over all financial condition of the farmer is the best on record. The livestock men in the Mountain States have done well likewise. Most of the states grow an abundance of field crops, and the prices of these have been good.

The western states could use probably 25 or 30 percent more nitrogen and possibly 50 percent more treble or triple superphosphate than is now available. These states hope that in the near future plants will be built in their own areas to take care of fertilizer needs. ★★

Industry Patents

The following patents have recently been issued by the U.S. Patent Office on products and devices in the agricultural chemical field. Copies of the patents may be obtained at 25c each by addressing the U.S. Patent Office, Washington 25, D.C.

Trade Mark Applications

VERMEX, in capital letters, for insecticides. Filed May 8, 1946 by Vermex Company of America, Glendale, Calif. Claims use since November, 1940.

GARDENER'S FRIEND, in caps and lower case, for garden insecticides, both spraying and dusting. Filed May 29, 1947, by F. C. Turner, doing business as Agricultural Chemical Mills, Marion, Illinois. Claims use since Apr. 1, 1944.

M 16, a large script capital "M" with the 16 within the loop of the stem, for fertilizers. Filed Mar. 24, 1947, by Emmert R. Wilson, doing business as the M16 Products Co., Stockton, N. J. Claims use since June, 1945.

DEAD-LITE, in caps and lower case, for liquid insecticide composition. Filed Apr. 2, 1947, by the Higley Chemical Co., Dubuque Ia. Claims use since Oct. 27, 1931.

TICKAWAY, in capital letters, for insecticides. Filed Apr. 24, 1947, by Goodwin Laboratories, Inc., New York. Claims use since Apr. 22, 1947.

BERCO, these letters within a circle formed by a geometrical figure resembling the 16 points of the compass, for methyl bromide for use as a fumigant and insecticide. Filed Oct. 1, 1946, by J. Berlage Co., Inc., New York. Claims use since December, 1945.

GRAINOSECT, in capital letters, for insecticide. Filed June 2, 1947, by West Disinfecting Co., Long Island City, N. Y. Claims use since December, 1930.

LIQUI-MIST, in heavy capital letters, for insecticides. Filed Nov. 25, 1947, by Food Machinery Corp., San Jose, Calif. Claims use since Sept. 24, 1947.

TOXICHLOR, in ultra-Bodoni capital letters, for insecticides. Filed Nov. 25, 1947, by Thompson-Hayward Chemical Co., Kansas City, Mo. Claims use since July 15, 1947.

X-APHIS, in capital letters, for insecticide for spraying plants. Filed Apr. 3, 1946, by Hovley & Dalby, Brawley, Calif. Claims use since Apr. 1, 1942.

GREEN CROSS, represented with heavy cross with the words on each side. For insecticidal and fungicidal plant spraying and powdering operations. Filed July 15, 1947, by John Lucas & Co., Inc., doing business as Lucal Kil-Tone Co., Philadephia. Claims use since Jan. 11, 1915.

SUPER-ADHESIVE, in capital letters, for sulphur. Filed Aug. 25, 1947, by Stauffer Chemical Co., San Francisco, Calif. Claims use since Apr. 30, 1928.

RATCEED, in capital letters, for rodent exterminator. Filed Sept. 2, 1947, by W. G. Reardon Laboratories, Inc., Port Chester, N. Y. Claims use since March, 1928.

RAT SEED, in capital letters, for rodent exterminator. Filed Sept. 2, 1947, by W. G. Reardon Laboratories, Inc., Port Chester, N. Y. Claims use since Nov. 9, 1927.

Industry Patents

2,438,900. PROCESS FOR SEPARATING BENZENE HEXACHLORIDE ISOMERS. Patent issued April 6, 1948, to Herbert Cooke, Liverpool, and James C. Smart, Widnes, England, assignors to Imperial Chemical industries, Ltd. A process for treating crude BHC to obtain a mixture of isomers containing an enhanced proportion of the gamma isomer which comprises extracting the crude BHC with an amount of a selective solvent taken from the class consisting of aliphatic hydrocarbons, chlorinated aliphatic hydrocarbons and cycloaliphatic hydrocarbons having 6-carbon atom ring sufficient to dissolve gamma isomer and leave a substantial proportion of the alpha isomer undissolved, and separating the solid alpha isomer from the gamma isomer-enriched solution.

2,438,955. INSECTICIDE COMPRISING MONO-ALKYLATED DIPHENYLENE SULFIDES AND METHOD OF USING SAME. Patent issued April 6, to Sager Tryon, Long Island City, and Peter LaRoche de Benneville, New York, N. Y., assignors to Allied Chemical & Dye Corp. An insecticide adapted for combating larvae of chewing insects comprising a mono-alkylated, diphenylene monosulfide the alkyl group of which contains from 3 to 6 carbon atoms, admixed with a carrier therefor.

2,439,432. AMMONIATION OF FERTILIZERS. Patent issued April 13, to Frank G. Keenen, Swarthmore, Pa., and Ralph L. Dodge, Wilmington, Del., assignors to E. I. duPont de Nemours & Co. Inc., Wilmington. The process for producing fertilizer which consists essentially in mixing an acid superphosphate substantially simultaneously with calcium cyanamide, which reacts exothermally therewith, and ammonium bicarbonate, which reacts endothermally therewith, in the proportions such that there are added from 4 to 16 parts by weight of calcium cyanamide per 100 parts of super-phosphate, and 1.5 to 3 parts by weight of ammonium bicarbonate per part of calcium cyanamide, whereby the heat absorbed during the endothermic reaction with ammonium bicarbonate is substantially compensated by the heat given off during the exothermic reaction of the super-phosphate with the calcium cyanamide, and reversion of the phosphate to compounds which are substantially unavailable as fertilizers is prevented.

Classified Advertising

Rates for classified advertisements are ten cents per word, $2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, $1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 254 W. 31st St., New York 1. Closing date: 1st of month.

Positions Open

Salesman — Experienced man with following on West Coast wanted by eastern manufacturer and importer of chemical, drug, aromatic chemical, flavoring, etc. materials. Give experience, etc. other account now handled, etc. in letter. Address Box 253, care of Agricultural Chemicals.

Agricultural Insecticides: Old established chemical manufacturing company in New York Metropolitan area has position open immediately for man with Sales Manager qualifications in agricultural insecticides field. Should have knowledge of trade and newer insecticides. Your application, including statement of training and experience, will be kept strictly confidential. Chemical Dept., Position Securing Bureau, Inc. 45 John St., New York 7, N. Y.

Positions Wanted

Doctor Chemistry: Broad knowledge application and manufacture insecticides desires position for work in South America. Speak Spanish fluently. Good contacts in several S. A. countries. Address Box 251, care of Agricultural Chemicals.

Medical Entomologist, Ph. D., with sixteen years of civil and military experience desires a part time consulting position with an insecticide organization in the New York area. Address Box 254, care of Agricultural Chemicals.

Econ. Entomologist, M. S. desires position. 15 years experience research, techn. field tests, field representation. Address Box 255, care of Agricultural Chemicals.

Economic Entomologist; with professional and commercial experience desires position. Long practical experience in insecticide and herbicide control and manufacturing. No extensive traveling. Address Box 257 care of Agricultural Chemicals.

Miscellaneous

Will Buy—Well-known manufacturer will buy going small business in chemical specialties, insecticides, or other household or agricultural packaged items. Send initial information in full confidence to Manufacturer Box 256, care of Agricultural Chemicals.

Pacific Coast Sales: New company with twenty year background in personnel experience in covering insecticide and allied chemical specialties entire Pacific Coast as far east as Denver interested in one or two additional manufacturers' accounts for that territory. Excellent proved sales record and wide knowledge coast market. If interested, communicate Box 252, care of Agricultural Chemicals.

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Control Officials to Meet

Plans are under way for the second annual meeting of the Association of Economic Poisons Control Officials scheduled to be held at the Shoreham Hotel, Washington, D. C. on October 9. A full day's program has been planned, starting at 9 a. m., and continuing until evening. Four speakers will be presented; two representing the manufacturer's group, and two from the control officials' organization. A luncheon will be held, but there will be no evening meetings, aside from those scheduled for the executive committee.

The remainder of the week will be occupied by meetings of the Association of Official Agricultural Chemists, fertilizer, and feed associations at the Shoreham.

Advertisers' Index

(The Advertisers' Index has been carefully checked but no responsibility can be assumed for any omission.)

TALE ENDS

A booklet, "Chemical Fertilizers are *Not* Needed in the Garden" has been published by Organic Gardening Magazine, Emmaus, Pa. It emphasizes the use of compost and condemns all use of commercial fertilizer. "The so-called chemical fertilizers are ruining the soils, undermining the health of both man and animal, and are producing artificially blown-up foods that lack real nourishing qualities and which are all but tasteless," it says. "Foods grown with harsh, artificial fertilizers are losing their old time taste. Vegetables raised with chemicals are tougher and more fibrous. Fruits are later ripening, smaller, less nutritious and do not have the old time taste.

"When strong — and often poisonous — chemical fertilizers and sprays are doused into the soil, not only is your food affected, but the beneficial soil microbes' activities are affected to such an extent that the dangerous organisms get the upper hand and plant disease results. . . . In our gardens we have used no poison sprays, no artificial means of gardening and you're never seen such beautiful plants and flowers . . . "

Realistic thinkers in the agricultural field must shudder to think of trying to feed the world by letting crops grow in "nature's way." We can visualize the field day which would be enjoyed by European corn borer, grasshoppers, white-fringed beetles and their like if American agriculture should start a "back to nature" movement sans all chemical controls. And so far as increasing crop yields without the help of commercial fertilizer, one might as well consider breaking an auto speed record using kerosene for motor fuel. U. S. Department of Agriculture statistics on the tremendous increase in per acre yield of nearly all crops through the use of commercial nitrogen, phosphoric acid and potash are so overwhelmingly convincing that serious debate on the subject is out of the question.

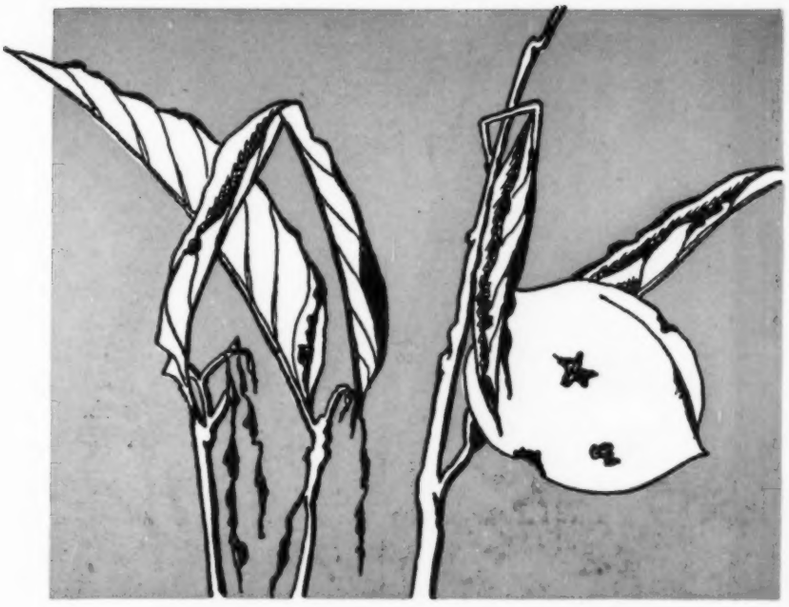
Organic materials are admittedly useful as plant food, but alone are completely inadequate.

PRINTED BY WATKINS PRINTING CO., BALTIMORE

TARNISHED PLANT BUG

(*Lygus pretensis* Linné)

ADULT
3X

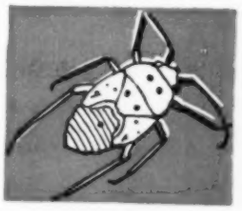


BUG OF THE MONTH

. . . controlled with Sabadilla Insecticides

THE Tarnished Plant Bug and its Lygus relatives spread their destructive attacks over more than 50 economic plants—beets, chard, celery, beans, potatoes, cabbage, cauliflower, turnips, salsify, cucumbers, cotton, tobacco, alfalfa, as well as most deciduous and small fruit trees.

Shown above is only one instance of Lygus bug damage—in this case terminal-shoot injury and catfacing of peaches. In the West, *Lygus hesperus* is a major alfalfa scourge. In the South and Southwest, Lygus is an avowed enemy of cotton. In the North and Northeast, the Tarnished Plant Bug is a pervasive pest.



Until the past few years, no satisfactory method for control of Lygus infestations had ever been found. With the completion of work by the Wisconsin Research Foundation, production of Prentox Sabadilla Dust Concentrate, an activated toxicant specific to Lygus and other chewing and sucking insects, became possible.

Prentox Sabadilla Dust Concentrate offers the possibility of positive control wherever Lygus injury occurs. It is worth your careful investigation, and our technical staff is ready to cooperate with samples and complete information. Stocks are ample. Your orders can be filled promptly.

R. J. PRENTISS & CO., Inc.

110 WILLIAM STREET, NEW YORK 7, N. Y. 9 SO. CLINTON STREET, CHICAGO 6, ILL.

PRENTOX PEST-TESTED INSECTICIDE CONCENTRATES SOLD TO INSECTICIDE MANUFACTURERS ONLY

FOR THE EXCLUSIVE USE OF INSECTICIDE MANUFACTURERS

TOXAPHENE

(HERCULES CHLORINATED CAMPHENE)

Here is *another* pest control problem solved by Toxaphene*. In widely increasing use this year among cotton farmers throughout the nation, to control the boll weevil and other insects, Toxaphene [Hercules Chlorinated Camphene] is also demonstrating its effectiveness in combating the grasshopper.

Tests by the U. S. Department of Agriculture and other qualified authorities show that dusts or sprays made with Toxaphene will rapidly kill the grasshopper and stop further migration of this pest.

Specific recommendations on the use of Toxaphene can be obtained from individual state authorities. For technical information on this toxicant as an ingredient in finished dusts and sprays, write:

TOXAPHENE ALSO KILLS

BOLL WEEVIL
BOLLWORM
SOUTHERN GREEN STINK BUG
COTTON LEAFWORM
COTTON APHID
RAPID PLANT BUG
TARNISHED PLANT BUG
COTTON FLEAHOPPER
THRIPS
MANY OTHER
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